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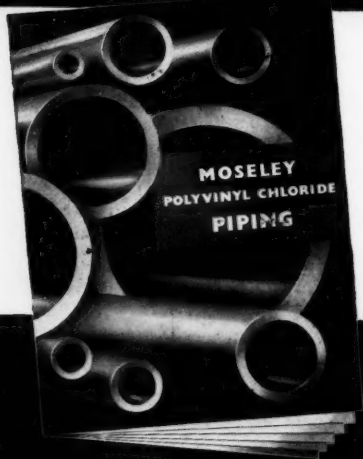


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The Mining Journal

London, May 22, 1959

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A Common Market for Latin America?

WHILE world attention has been focused on the European Common Market, the groundwork has been laid for similar economic unions across the Atlantic, which could also have an important bearing on the future pattern of world trade, although realization of this ideal may still be some distance off.

In December last year, a group of ambassadors and economic experts from the 21 American Republics set up a working group of 11 nations to give further study to a number of problems of Latin American economic development. The group's efforts have been concentrated mainly on finding practical ways of: (1) expanding basic commodity exports of the Latin American countries; (2) avoiding drastic fluctuations in the prices of these commodities in international markets; (3) promoting the establishment of regional markets in Latin America; (4) increasing the flow of private capital to the region; and (5) expanding programmes of technical co-operation.

A major step forward was made when the representatives of all 21 countries showed their willingness to co-operate in solving commodity problems—in particular, difficulties associated with the marketing of lead, zinc, coffee and cocoa.

Last month the Latin American Economic Committee (Cepal) held further talks, which were attended by delegations from Argentina, Brazil, Chile and Uruguay. The subject of discussion was the setting up of a free trade area between these countries. A projected agreement to be submitted to the respective governments was drawn up. If approved, it will replace the existing bilateral agreements between the four countries but will respect commercial treaties existing with other countries in the world, and also the rulings of Gatt.

A further step was taken this week when in Panama a 24-nation meeting of the U.N. Economic Commission for Latin America formally adopted a resolution calling for the creation of a Latin American Common Market. The project had hitherto been in the hands of the Commission's Secretariat without formal endorsement by member governments. The next step will be in February, 1960, when a meeting of member government experts to draft a "Common Market blueprint" has been called.

Support for the creation of a common market in Latin America has been promised by the United States. President Eisenhower has also asked Congress to approve U.S. participation in the formation of an Inter-American bank to assist in financing the economic development of Central and South American countries. This bank, which will have its headquarters in Washington, is regarded as a major move in Uncle Sam's attempts to win back its traditional good reputation in Latin America.

First explored for its gold and silver, Latin America has a long history of mineral development. Not only have precious metals been mined for centuries, but copper was mined in Chile and lead in Peru and Bolivia before the Spanish conquest. Today, the region's resources of copper, lead, zinc, tin, oil, bauxite and iron ore are steadily growing in importance.

Prospects for an increase in the primary smelting and refining of some of Latin America's most important non-ferrous metals are reviewed on page 555. Doubtless, a further impetus to the expansion of both mine and smelter production will result from the establishment of the proposed common market and the Latin American bank.

The development of this huge economic union of predominantly mining and agricultural countries, if it materializes, should be of considerable interest to British exporters, who are already becoming increasingly conscious of the opportunities which Latin America presents. In particular, there should be expanding openings for the sale of mining, ore dressing, and smelting equipment, as well as for the many other types of engineering and ancillary equipment required for the establishment of new mining ventures and the construction of railways, roads and harbours. It must be anticipated, however, that Latin America's Common Market will be a highly competitive region for mining machinery exporters. Apart from the dominant part which has been played by American capital in opening up some of the region's major mining fields, Japanese and German interests are also becoming increasingly active in various Latin American countries. Nevertheless, this huge collective market might well prove rewarding to those British exporters who are prepared to spend time and money on first-hand investigation.

It is also worth noting that, parallel with the steps being taken in Latin America, the Organization of Central American States has been quietly implementing its own economic union, aimed at increasing domestic industry and foreign trade. The countries concerned are Guatemala, El Salvador, Costa Rica, Nicaragua and Honduras. None of them ranks at present as important mineral producers, but it seems not inconceivable that the proposed link-up might serve as an incentive to the development of mineral resources which still remain largely undiscovered.

FROBISHER'S AFRICAN PROJECTS

An impressive indication of the growing extent to which Canadian capital and technological know-how are becoming associated with mining ventures in other continents is afforded by Frobisher's activities in Africa.

Over the past ten years Frobisher has sponsored expenditure of over \$30,000,000 on its own foreign aid programme, exploring and opening up its big new mining properties in various parts of Africa.

Best known of Frobisher's African interests is the Kilembe copper mine in the foothills of the Ruwenzori Mountains, Uganda, where some 2,700 Africans and 160 Europeans are currently employed. The smelting plant is situated nearly 300 miles eastward at Jinja on Lake Victoria. A new oxide ore treatment plant, completed last December, is in operation at the mine and will handle ore from a new open pit operation. This, along with regular underground operations from the major orebody, will raise overall milling rate this year to around 61,500 tons monthly. The next expansion phase—now under way—is designed to boost milling rate to 77,000 tons monthly by 1962. This programme will cost an additional \$2,800,000 and is being financed through earnings. Copper mining at Kilembe is described on page 559 of this issue.

Last year, with an average monthly production of 900 tons of blister copper, Kilembe was able to just break even with copper averaging 24.4 c. per lb. This year, the combination of a regular smelter output of 1,000 tons monthly with much higher prices—currently around 30-32 c. per lb.—should certainly be reflected in profitable

operations. Though cobalt-bearing concentrates are at present being stockpiled, it is hoped that some day the product can be marketed profitably.

A separate company, Kilembe Mines Ltd., was set up to exploit the Kilembe deposits. A holding company controlled by Frobisher Ltd.—Kilembe Copper Cobalt Ltd.—owns 70 per cent of the outstanding share capital of the operating company.

In partnership with Anglo American, R.S.T. and Union Corporation, Frobisher holds a 12,000 sq. mile exploration concession in Northern Rhodesia, extending some 200 miles northward from Livingstone. Exploration has been in progress for two years. While no economic deposits have as yet been uncovered, promising formations have been found.

In Southern Rhodesia, Frobisher owns the long-established Connemara gold mine, which has been operating for eleven years. Last year it milled nearly 200,000 tons for a recovery of 25,000 oz. of gold. An exploration office is maintained at this centre from which to direct possible future work in the area.

Another of Frobisher's African interests is a 37.6 per cent holding in Sukulu Mines Ltd., which holds proved and indicated reserves of 203,000,000 tons of apatite-columbium ores in north-eastern Uganda. Pilot plant work has indicated that commercial grade apatite and columbium concentrate can be produced. Production is being postponed pending the advent of more favourable markets for both products.

During a recent visit to Africa the president of Frobisher, Mr. A. J. Anderson, secured a firm promise from government officials in Somalia that his company would soon get a signed "Convention" (since received) granting exclusive oil exploration and exploitation rights over a vast stretch of this territory. The company is also searching for oil over a 78,000 sq. mile section straddling the Kenya-Somalia border, which is said to be among the few large unexplored sedimentary basins left in the world. Valuable air photo cover is available in Kenya, and is being used for the preparation of geological maps. This work is being done under contract by Hunting Technical Services Ltd. The aerial photography work over a 20,000 sq. mile stretch of Somalia near the Kenya boundary is being done by Spartan Air Services, Ottawa. A land party under a Dutch oil geologist has moved into the field in the Northern Frontier district.

All planning for Frobisher's African interests is drawn up at the company's head office in Toronto. Field work is supervised by experienced Canadian mining engineers and plant specialists. The bulk of the equipment and supplies is purchased in Africa, the U.K. or Western Europe.

SOVIET TECHNICAL LITERATURE ON THE GEOLOGY OF URANIUM

Translations of Russian scientific texts are rapidly increasing in number, and there is a growing awareness in this country of the wealth of Soviet technical literature. Specialist journals regularly appear in the U.S.S.R. entirely devoted to subjects on which there is a paucity of information in the Western World, and there are British companies which have found it profitable to retain the full-time services of a Russian translator to digest the information in Soviet publications in their field. The translation policy of the D.S.I.R. has recently been revised, and there are now a number of organizations from which translations of articles in the Russian technical press can be obtained.

One of the American organizations engaged in translating Russian literature is Consultants Bureau Inc., of New York,

which has a team of bilingual scientists, each a specialist in his field. Soviet publications on atomic energy have been made available in translation under paper covers by the Bureau for some time, but the present volume is only the second cloth-bound book produced in co-operation with Chapman and Hall, of London, to provide a reference work for permanent use.

The Geology of Uranium is a collection of twelve papers originally published as Supplement No. 6 of the 1957 *Soviet Journal of Atomic Energy*, and now presented complete with all diagrammatic, tabular, and photographic material integral with the original text. Reproduction by the multilith process was carried out in the United States, and although the illustrations are not of a high quality, this is almost certainly due to the poor quality of the originals, the standards of Russian printing being generally lower than those of the West.

Almost half of the 128 American quarto pages are devoted to six papers on uranium mineralogy. The first of these is a detailed description of nenadkevite, a silicate of quadrivalent uranium resembling coffinite. Uramphite, a hydrous uranyl, and ammonium phosphate occurring in coal deposits is also the subject of a detailed paper, and is followed by three short notes on a new uranium silicate, ursilite, on the conditions of formation of natroautunite and the hydrochemical synthesis of uraninite. The sixth mineralogical paper is a detailed treatise on the thermal properties of a number of the less common uranium minerals. Thermal analysis methods are emphasized in this series of papers, but besides the thermal curves there is a great deal of tabulated data on the optical and physicochemical properties of uranium minerals, together with numerous photomicrographs and X-ray powder patterns.

There are two papers concerned with the formation of uranium deposits by the low-grade metamorphism of sedimentary rocks containing disseminated uranium. These papers comprise in effect detailed descriptions of two (unidentified) uranium deposits with radiographs, photomicrographs, and spectrographic analyses. The role of diagenesis is discussed and various hypotheses on the origin of the deposits are put forward, with frequent reference to Western literature on Rum Jungle and Canadian uranium occurrences.

A further pair of papers describe the theory and practice of radiometric analysis with particular emphasis on the β - γ method, which it is claimed has been more fully developed in the U.S.S.R. than elsewhere.

The final paper is a review of Western literature on aeroradiometric prospecting in Australia, Canada, and the United States. A total of forty-eight British, American, and Canadian references to the subject have been used in its compilation. No new knowledge can be contributed by a paper of this type, and it may be concluded it finds a place in this book for the sake of completeness. However, as it stands, it forms a comprehensive and interesting survey of the subject.

The volume is written in a concise style and is attractively produced. Very seldom does the construction of a sentence or the misuse of a word betray its origin in translation.

IDENTITY OF NEW GREEN RIVER MINERALS

Through the gift of a rare mineral from the Kola Peninsula in Arctic Russia, scientists of the United States Geological Survey have been able to identify an unknown mineral recently discovered in the Green River oil-shale formation of Sweetwater County, Wyoming. The Russian mineral, "Labuntsovite", is a complex sodium-potassium-

barium-niobium-titanium silicate, recently brought to Washington from Moscow by Professor K. A. Vlasov, of the Academy of Sciences, U.S.S.R., for a comparative study of its physical and chemical properties with those of the then unknown mineral from Wyoming.

Labuntsovite was first recognized by Russian mineralogists in 1955. A year later material like it was found by Survey geologists in Wyoming. The mineral is of special interest to earth scientists, because it is one of the several rare species found in the Green River sedimentary rocks that elsewhere in the world are found only in igneous rocks. Geological conditions existing at the time of formation of labuntsovite and the other Green River minerals were unique. In fact, many of the minerals discovered by Survey scientists in this formation are not known to exist anywhere else on earth.

Because the Green River formation of Wyoming, Utah and Colorado is known to contain vast deposits of such commercially valuable minerals as soda ash and hydrocarbons, as well as other minerals whose present interest is purely scientific but which may one day turn out also to have economic significance, the Geological Survey has assigned a group of geologists, mineralogists, crystallographers and geochemists to study this formation.

IRON AND STEEL IN AUSTRALIA

The great expansion in the operations of The Broken Hill Proprietary Co. Ltd. and its subsidiary, Australian Iron and Steel Ltd., have displaced imported steel to an increasing extent with the result that Australia is currently more than self-sufficient over a wide range of steel products. Mr. C. York Syme, chairman of directors of Australian Iron and Steel, has stated that Australian exports of steel and goods manufactured from steel at least offset the cost of imported steel. Plans for further expansion to meet future needs are being maintained and in some directions are likely to extend.

Excellent work has been done in colliery mechanization and the chairman said that the programme of development included the installation of an underground conveyor belt system in the Wongawilli colliery. This is the first such belt to be installed underground in the company's southern collieries and makes possible improvement in transport of coal from the face to the pit top. Construction of the third battery of by-product coke ovens at the steelworks is in progress. The new battery is being built in two sections, each of 48 ovens; the first 48 will go into use in 1960, and when the battery is completed, there will be a total of 240 ovens at Port Kembla. The third open hearth furnace was commissioned in February and has raised the ingot-making capacity at Port Kembla by a further 300,000 tons of steel per annum, representing a 10 per cent increase for the industry, as a whole. Total ingot steel-making capacity of the Port Kembla works is now 2,050,000 tons and by the middle of the year it is expected to reach 2,200,000 tons.

The new blast furnace is nearing completion; it will add approximately 600,000 tons or 20 per cent to Australia's pig iron-making capacity. The new inner harbour works will permit the unloading of all raw materials directly from ships into the blast furnace stockyard as at the Newcastle works. The Port Kembla tinplate plant has now reached a production rate of 80,000 tons per annum, and extensions just completed, together with further additions to be carried out by the end of 1959, will raise the total productive capacity to 108,000 tons of hot-dipped tinplate per annum, an increase of 35 per cent in the twelve months.

Brighter Outlook for South Africa's Older Mines

THE glamour still attaches to the young gold mines of the Union with their reports of continuing improving development results in the Orange Free State and startling jumps in working profits. This latter has resulted in President Brand pushing West Driefontein into second place as the world's richest producer with a profit of £800,000 and also establishing itself as the lowest cost producer in the Free State.

Nevertheless, after far more years than are pleasant to remember, the prospects of the old mines have taken a sharp turn for the better. Somebody once described gold mining as the ultimate parasitic industry since it prospered on others' misfortunes. This specifically referred to the days of the Gold Standard, when the metal price moved up automatically in times of economic strain. Although the Gold Standard is no longer with us, the mining industry is now benefiting from the fact that the recession which started in the United States has reached this country, writes our South African correspondent.

Secondary industry is feeling the draught—and particularly the engineering trade. Not only have a large number of small undertakings closed down entirely, but even the big ones have been laying off men. In consequence, there has been a heavy flow of skilled men seeking employment in the mining industry. In addition, the contraction of operations by those mines in the last stages of their lives brought about retrenchment.

The position is now that the mining industry is at long last able to fill all its vacant posts at the artisan and mining levels, as well as to become selective in quite a degree as to whom it employs. Consequently, in addition to having enough workers, those employed are more efficient.

This upsurge in the European labour supply has coincided with a sharp increase in the Native labour force. Normally, this time of the year sees this at its seasonal best, but the present figure is the highest since 1941. The reasons for this include the falling off in employment in secondary industry in the Union; the effects of lower world prices of various commodities which have affected the economies of other African territories; and the government policy of repatriating unemployed Natives in the towns to their homes, either inside or outside the Union.

Some quarters may well regard this last as a "police state" action, but the growth of a large unemployed population in the urban areas constitutes a serious social problem, as shown in the increase in the incidence of serious crime of late. Once repatriated, it is possible for the Natives to apply for work on the mines.

Apart from this particular aspect, there is a growing number of Natives who feel that mining offers better terms of employment than secondary industry, even though at first sight the cash wage of the latter would appear much more attractive.

Mr. T. Coulter makes this point in his African and European annual review, saying: "There is reason to believe that an important cause of the present position lies in the longer term, and is connected with the fact that the mining industry's policy of making up cash wages with other real benefits on a generous scale, such as proper feeding, living conditions, recreation facilities, medical treatment, and the like, is beginning to bear fruit. The security and convenience of employment on the mines, coupled with organized travel to and from their homes at the beginning and end of their contracts, efficient deferred-pay systems, and other fringe benefits in the territories are

inducements which the Natives will come to value more highly as time goes on."

This opinion is confirmed by the recent statement of Mr. K. A. B. Jackson, manager of St. Helena G.M., that 42 per cent of Native workers recruited by the mine since September last year had seven or more months of previous service on "Saints", and 47 per cent had the same service on other mines. Only 6 per cent were completely untrained. This is a sharp change from the position not so long ago, when the bulk of Native recruits to the industry were completely "raw". Inquiries show that much the same position exists on other properties.

The net result of all this is that all mines will be operating far closer to maximum milling rates than for years past. For the lower grade mines—particularly those with large mills—this is of major significance.

The relationship between milling rates and costs is a close one. In the case of low-graders, it is a vital one. Low milling rates boost costs, and where the margin of profit is small this is highly geared. Some mines are in the fortunate position of being able to boost grade to some extent in lean months, but many cannot. If milling rates can be maintained, and it looks as if they can, it will make a great difference to the old-stagers. Apart from the aspect of profitability, there is also the important aspect of some lowering of the pay limit coming about. In this way tonnages which had been excluded from ore reserves can be brought back into them, and thus contribute to a prolongation of life. This is quite an important consideration when it does look as if, within the next few years, there might be a higher gold price.

In addition to this development, another important relief has come the way of the industry. A particularly heavy burden had to be shouldered by it last year in the way of increased contributions to the Pneumoconiosis Compensation Fund to meet the increased benefits granted to silicosis victims, despite the fact that the government provided the funds for back payments to bring the fund up to its actuarial requirements.

For the year ended March 31, 1959, the liability of the mining industry was fixed just short of £2,500,000. For the current year this has been cut to £800,000, and will probably be less as the latest valuation of the fund discloses a surplus.

Last year's contributions hit a number of the old mines heavily. In some cases it represented well over 1s. per ton milled. When it is considered that one-third of the non-uranium mines were operating on a profit margin of less than 2s. 6d. a ton, it is clear that the reduction is an important one. As a direct charge on working costs, it will have much the same implications as the increase in the labour force.

All in all, therefore, the picture of the older mines is far brighter than it was this time last year, despite the fact that nothing emerged directly from the consultations between the government and the industry on ways and means of prolonging the lives of the marginal mines. From the national point of view, this still cannot be pushed entirely out of the way. In spite of all the talk, the present setback in secondary industry has shown that its promotion cannot replace mining's contribution to the economy. Germiston, one of the oldest mining centres, has over the years built itself up as a premier industrial town against the day when the mines would close down. In spite of this, it is suffering from large-scale unemployment at the present time.

Mining and Smelting in

Latin America

AN economic survey of Latin America in 1958, issued by the United Nations, says the salient feature of the development of the mining section was the continuance of the depressive trend initiated in 1957. The evolution of world market conditions was unfavourable in Latin America as regards external prices and demand. Although this did not affect the volume of production in the specific case of certain ores, it did exert a negative influence on income from mining activities, besides having repercussions on the capacity to import of those countries which are highly dependent on their exports of mining products.

Since 1957, copper had been feeling the adverse effects of a sharp drop in world market quotations, and in 1958 production declined considerably, despite the reversal of the price trend in the second half of the year. Although there was also a falling off in world production of copper, it was less marked than in Latin America. Consequently, the share of Latin American production in world output contracted from 18 per cent in 1957 to 17 per cent in 1958.

Chile and Peru were the countries most affected, since it was in them that the decline mentioned was concentrated. Mexico, on the other hand, exceeded its average half-yearly output in 1957 by almost 4,000 tons in the first six months of 1958.

In the case of lead and zinc, up to mid-1958 there were no developments which influenced the levels of either world or Latin American production. The latter, therefore, maintained its share in the world total. However, certain external measures adopted in the second half of the year may have had favourable repercussions on production figures for the rest of the year. The two leading Latin American producers—Mexico and Peru—managed to maintain their output at its 1957 level.

The possibility of an increase in the primary smelting and refining of some important non-ferrous industrial metals depends on the early termination of several projects and the initiation of others. These projects vary from country to country. In Argentina and Brazil, they are primarily intended to raise domestic production sufficiently to cover growing domestic requirements, and the new plants would be sure of a market, whereas in the case of Chile, Cuba, Mexico, and Peru, their main purposes are to facilitate, increase, or maintain exports, broaden markets, reduce costs, and retain a larger proportion of the value added. In these cases it is expected that utilization of the new production capacity, especially by the big companies, will tend to fluctuate.

Copper

The most important project for copper is that at Toquepala, Peru, which is nearly ready. The Ilo smelter, which will be part of this new mining complex, is expected to begin operations in the first half of 1960 with a capacity of over 100,000 tonnes.

In Chile, the national smelting enterprise has contracted the necessary equipment for a smelter to be set up at Ventanas. It is hoped that it will start operations in 1961 with an initial annual capacity of 25,000 tonnes, to be later raised to 30,000 tonnes. This plant, like that at Paipote, will be used to process the output of the small and medium sized mining companies. The Paipote plant, which turned out 20,000 tonnes of blister in 1958, is also being expanded so that its future capacity will be 30,000 tonnes annually. It is anticipated that more plants will be successively established in the country. A private company is considering the installation of a smelter with a capacity of 13,000 tonnes in the north in the near future; this would have to be financed by international sources.

The Andes Copper Mining Co. is carrying out an investment programme involving some \$105,000,000. Apart from the sinking of a new mine at El Salvador to replace that at Potrerillos, and of another at La Africana which is already in operation, the programme envisages the expansion of the Chuquicamata plant so as to increase its electrolytic refining capacity and add facilities for the separation of molybdenum.

The other big company, Braden, has launched a \$72,000,000 plan for the improvement of its plants. It is hoped that the new installations will be fully integrated by 1962, so that the company can smelt and refine on its own premises. Brazil and Cuba have projects for copper smelters that are already well advanced.

Other Metals

As regards zinc smelting, Peru has a project for processing the output from the smaller mining companies. The bulk of their production is still exported in the form of concentrates. Fairly large smelters are also to be constructed in Mexico (10,000 tonnes) and Brazil (7,000 soon to be raised to 15,000 tonnes). Peru also has projects with regard to lead.

The first large-scale tin smelter with an electrolytic plant has recently entered into production in Brazil. It has a capacity of 7,000 tonnes, and will process domestic and Bolivian minerals.

Aluminium, which needs a large amount of electric energy for its production, is not yet manufactured on any appreciable scale in Latin America. The only country currently producing it in the region is Brazil, which turned out 10,000 tonnes in 1958, i.e. less than half its consumption requirements in spite of the strong contraction in demand during that year.

However, it is anticipated that by 1965 Argentina and Peru will be producing some 20,000 tonnes, Venezuela 50,000 tonnes, and Brazil 150,000 tonnes.

PRODUCTION OF COPPER
(000's tons)

Country	1957	1958*
Chile	451.2	177.5
Mexico	60.1	33.8
Peru	42.2	19.6
Total Latin America	553.5	230.9
World Total	3,040.0	1,377.0
Percentage of Total	18.2	17.0

PRODUCTION OF ZINC
(000's tons)

Country	1957	1958*
Mexico	243.6	123.1
Peru	29.6	14.9
Total Latin America	273.2	138.0
World Total	1,640.0	819.0
Percentage of Total	16.7	16.7

PRODUCTION OF LEAD
(000's tons)

Country	1957	1958*
Mexico	214.8	108.6
Peru	69.1	32.3
Total Latin America	283.9	140.9
World Total	1,910.0	954.0
Percentage of Total	14.8	14.7

* January/June

The Mining Industry in Bulgaria

DURING the five years 1954-58, the Bulgarian Government spent £55,000,000 on geological prospecting, and made investments totalling hundreds of millions of pounds on the most modern means of exploiting the results of these prospecting investigations. Indeed, all reports reaching us from that country indicate that the Bulgarian mining industry may be regarded as potentially healthy.

Coal

The reserves so far located are estimated at: black coal (including anthracite), 33,000,000 tonnes; brown coal, 300,000,000 tonnes; and lignite, 3,500,000,000 tonnes. The aggregate annual output was raised, by the end of the second Five-Year Plan (1953-57) to 11,886,000 tonnes, as compared with the pre-war figure of 2,214,000 tonnes. This represented an advance, under the Plan, of 63 per cent in lignite, 59 per cent in brown coal, 87 per cent in black coal, and 35 per cent in anthracite, achieved by the opening up of new mines with an aggregate annual capacity of 6,600,000 tonnes, which was about 3,000,000 tonnes in excess of what had been planned beforehand. The new mines opened up included a number of brown coal mines in the Dimitrovo, Bobovdol, Pirin, and Black Sea coal-fields, and of lignite mines in the Maritsa Basin and in the Balkan mountains. A large proportion of these are open-cast workings, many of which, and notably those in the East Maritsa Basin, are highly mechanized.

During the first year of the third Five-Year Plan (1958) the aggregate output was increased by a further 7 per cent to 12,730,000 tonnes, about 700,000 tonnes more than was expected. There was no doubt that the target figure set for 1962, when the Plan ends, of 19,215,000 tonnes would be reached. New capacity of about 10,000,000 tonnes annually was to be opened up, representing about 93 per cent of that located. It is not surprising, therefore, that the government should have decided (in March this year) to step that figure up to 25,000,000 tonnes, representing an advance of 100 per cent, instead of 62 per cent, and have indicated that a further advance, to between 300 and 400 per cent above 1957 (between 38,000,000 and 52,000,000 tonnes) must be the target for 1965. This expansion is to be achieved by intensive exploitation of the (highly mechanized) lignite deposits in the East Maritsa Basin.

Vigorous steps for the increased production of black coal are also to be taken to meet the growing demands of the steel and chemical industries; output is to be increased to 970,000 tonnes annually by 1962, and to 1,200,000 tonnes by 1965. The immediate target, for 1959, has been stepped up from 13,406,000 to 15,015,000 tonnes, representing an increase of 18 per cent in the year.

Iron

The reserves so far located are estimated at 270,000,000 tonnes, of which 250,000,000

tonnes are in the region of Kremikovtsi, near Sofia, where the average thickness of the ore layers is about 100 metres. This has come as a surprise for the geologists, who expected to achieve an expansion by 20 of the located reserves in 1957, but, in fact, achieved an expansion by 180. It has been a welcome surprise for the government, whose preoccupation had previously been to secure enough ore for the Lenin Iron and Steel Works near Dimitrovo, but who have now found it possible to project the establishment of a larger enterprise at Kremikovtsi. Pending the development of these resources, production is still insignificant, the latest figures published showing the output of iron ore during the first half of 1958 to have been only 140,000 tons. What may be expected in the future may be deduced from the following facts regarding plans for the production of iron and steel. At the end of the second Five-Year Plan (1957), the first stage only of the construction of the Lenin Iron and Steel Works had been completed, but as a result the output of steel in the following year (1958) went up by 32 per cent to 210,575 tons, and that of rolled steel products by 19 per cent to 136,780 tons.

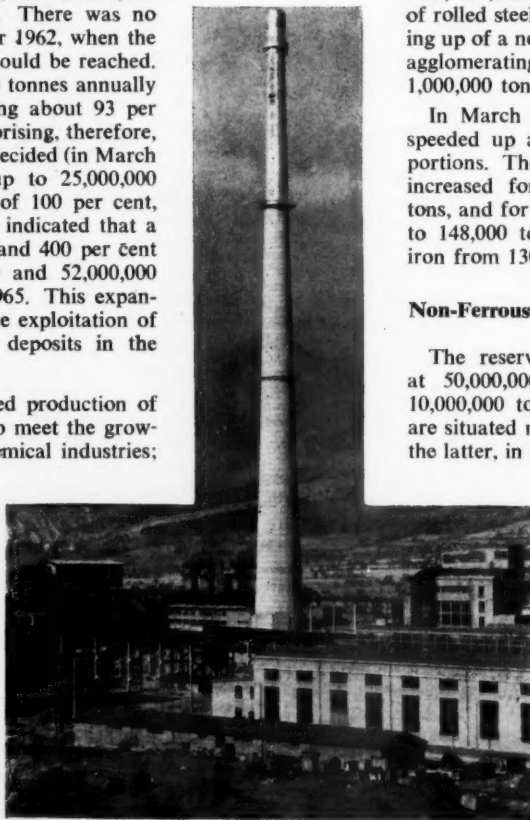
Under the third Five-Year Plan, these outputs were to be increased, in 1962, by 205,000 tons of pig iron, 353,000 tons of steel, and 276,000 tons of rolled steel products. This expansion was to be achieved by the completion of the second stage of the Lenin Iron and Steel Works. In the meanwhile, preparation for very substantial further expansion of capacity was to be made by the commencement of work on a new iron and steel works at Kremikovtsi, with a view to the completion by 1964 of the first stage there, with an annual capacity of 300,000 tonnes of pig iron, 450,000 tonnes of steel, and 300,000 tonnes of rolled steel products, this involving the opening up of a new coal pit and of an enriching and agglomerating plant with an annual capacity of 1,000,000 tonnes.

In March this year, however, this Plan was speeded up and somewhat revised in its proportions. The target figures for 1959 are to be increased for steel from 210,000 to 225,000 tons, and for rolled steel products from 132,000 to 148,000 tons, and to be decreased for pig iron from 130,000 to 123,000 tons.

Non-Ferrous Metals

The reserves so far located are estimated at 50,000,000 tonnes of lead-zinc ore and 10,000,000 tonnes of copper ore. The former are situated mainly in the Rhodope mountains; the latter, in the neighbourhood of Pirdop, near the port of Bourgas. The geologists expect confidently to discover at least 8.3 per cent more of the former and at least 26.2 per cent more of the latter in the near future.

In order to meet the anticipated demands of Bulgaria's growing engineering industries, the government has spent a great deal of money on prospecting for these metals and on the establishment of plant for their extraction and refining.



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At the bottom of the opposite page is a view of the Georgi Damyanov copper plant at Pirdop. On this page, above, is the flotation plant at Rudozem. Alongside, at right, testing electrolytic copper at Pirdop; at centre, drawing off lead at Kerdzhali; and below, the lead-copper works at Rudozem

As a result, production of non-ferrous concentrates increased to 341,000 tonnes and that of pure lead and zinc to 25,000 tonnes and 8,000 tonnes respectively, under the second Five-Year Plan. This production enabled the internal demand to be met entirely, with an aggregate surplus available for export of about 160,000 tonnes (1957). Copper production was as yet insignificant. Under the Plan a flotation plant and refinery was established at Kerdzhali, in the Rhodope mountains, with an annual capacity of 4,500 tons of zinc, 10,000 tons of lead, and 9,000 tons of sulphuric acid, and work was started at Pirdop on the establishment of a copper plant with an annual capacity of 10,000 tons of copper sulphate.

The Third Five-Year Plan

The third Five-Year Plan envisages the production by 1962 of 437,800 tonnes of concentrates, 33,000 tons of lead, 44,000 tons of zinc, and 12,630 tons of electrolytic copper. In order to achieve these targets, the extraction of lead-zinc ore was to be increased to 2,890,000 tonnes a year and that of copper ore to 980,000 tonnes; new enriching plants were to be established for the handling of 1,000,000 tonnes of lead-zinc ore and 250,000 tonnes of copper ore a year; the refinery at Kerdzhali was to have its capacity increased to 22,000 tonnes of lead and 14,000 tonnes of zinc a year, that at Kurilo was to be reconstructed on more up-to-date lines to produce 11,000 tonnes of lead a year, and a new one was to be started near Movdir so that its zinc section, with a capacity of 30,000 tonnes a year plus 60,000 tons of sulphuric acid, would be in operation in 1961; the copper plant at Pirdop was to be completed in 1958, and was to have an electrolytic section with a capacity of 15,000 tons a year by 1962.

The results achieved in 1958 were:

			Tons	Increase
Lead-zinc ore	...	...	2,241,000	15%
Copper ore	...	...	702,000	25%
Lead concentrate	...	...	101,000	12%
Zinc concentrate	...	...	96,000	11%
Lead	...	...	26,070	37%
Zinc	...	...	8,234	10%

In March this year the foregoing targets were substantially revised. The lead output for 1965 was to be at least 90,000 tonnes, and the zinc output to be at least 50,000 tonnes. The Georgi Damyanov copper plant at Pirdop, which was officially inaugurated and set in operation on



December 6, 1958, was to produce 17,000 tons of electrolytic copper by 1962, instead of 15,000 tons, and about 25,000 tons by 1965. This last increase was to be made possible, since the supply of copper ore was barely sufficient owing to its low copper content, by the use of zinc sulphate instead of copper sulphate for insecticidal purposes in agriculture.

The importance of producing refined metals rather than concentrates was strongly emphasized in this latest directive, in which it was pointed out that the export of zinc in place of zinc concentrate would alone bring in an additional 30,000,000 leva (£1,500,000) a year, besides providing vast quantities of sulphuric acid at about half the cost now incurred in its manufacture from pyrites at the Stalin Chemical Works at Dimitrograd.

Emphasis was laid also on the production of copper from polymetallic ores, sometimes more readily available, and on the extraction from concentrates of the small quantities of such valuable metals as gold, silver, cobalt, gallium, thallium, germanium, etc., which they usually contained.

The extraction of only a few of these at the new refinery being built near Plovdiv is expected to earn about 40,000,000 leva (£2,000,000) a year.

Though a little behindhand in the matter of capital development during the first quarter of this year, owing to some delay in the supply of plant and machinery, which is to be corrected, Bulgaria has achieved good results generally in the field of production, especially in relation to mining and heavy industry. The planned figures have been exceeded, notably, in the production of coal, crude petroleum, steel, rolled steel products, lead and cement, of which the output, expressed as a percentage of that for the first quarter of last year, are shown below:

Coal	...	...	117	3,686,000 tons
Steel	...	...	111	55,174 tons
Rolled Steel	...	...	120	41,053 tons
Lead	...	...	142	8,485 tons
Cement	...	...	157	329,000 tons

Production as a whole was 2 per cent higher than it was last year, and labour productivity 5 per cent higher.

Methods of Iron Ore Recovery

A RECENT article by R. E. Barthelemy, director of research at Carpc Research and Engineering, which is a condensation of his paper "Iron Ore Beneficiation and High-Tension Separation", presented to the American Mining Congress, San Francisco, puts the case for high-tension electrostatic separation as a means of beneficiating iron ores.

Mr. Barthelemy suggests that as iron ore is not affected by severe winter conditions, does not require high temperature treatment such as a magnetizing roast, has a high capacity, and possesses low operation cost, high-tension separation is likely to replace other methods. In the treatment of the Canadian-Labrador iron ores, it is claimed that the highest grade of concentrate is possible with good recovery, whilst the separation of apatite and biotite from iron minerals is excellent.

Demands of Separation

As separation technique depends on the difference in superficial conductivity, only such minerals as haematite, magnetite, and martite, can be separated. Hydrated minerals such as goethite and limonite, which have a much lower dielectric constant (around 10 as compared with about 80 for haematite and magnetite), cannot be separated. Similarly, pyrolusite cannot be separated from haematite or magnetite, as it has approximately the same dielectric constant.

Usually, it has been found that a final tailing can be rejected in the rougher stage and often in the first cleaner tailing. Final cleaning produces a shipping grade and the tailing from this operation is scavenged, producing a concentrate which is returned to the head of the cleaner circuit.

In some cases material as coarse as 28 mesh can be treated, but it is claimed that material below 200 mesh can be treated, although it requires desliming in some cases, such as when limonitic slimes are present. Grades from 64 to 69 per cent Fe have been produced in tests from ores containing 24.5 to 38 per cent Fe, with a recovery ranging from 86.5 to 97.5 per cent.

Although it may not be economical to beneficiate iron ores which require very fine grinding for satisfactory liberation, laboratory work indicates that an ore ground

to 100 mesh can be treated, provided the slime is elutriated at about 600 mesh. Recovery and grade are naturally inferior to those given above, but are of the same order as those obtained by flotation on the same ore.

Although much of the pioneer work in magnetic separation was done on dry material, in iron ore treatment, the emphasis changed in the course of time to wet operation. Nevertheless, there are a number of applications of dry magnetic separation which are currently in use, such as in the processing of kyanite, quartz, feldspar, and nepheline syenite, and there are possibly certain inherent advantages in using dry separation on iron ores.

Advantages of Dry Treatment

In an article by L. A. Roe, entitled "Advances in magnetic separation of ores" appearing in *Eng. Mining Journal* (December, 1958), the advantages of dry treatment are discussed.

At the present time, of course, all the magnetite ores are treated by wet methods, and the last ten years have witnessed the completion of a number of large plants such as those of Erie, Reseroc, and Oliver. A great deal of work has, therefore, been done in the application of wet magnetic separation to the concentration of the Mesabi taconites, and these have been described recently by Forcica, Hendrickson, and Palasvirta ("Magnetic separation for Mesabi magnetite taconite," by J. E. Forcica, L. G. Hendrickson, and O. E. Palasvirta; *Mining Engineering*, December, 1958).

The general flowsheet usually consists of "cobbing" after grinding in rod mills to minus $\frac{1}{4}$ in., when about 40 per cent of the feed can be rejected as tailing. The rougher concentrate is then ground in ball mills using one or two stages and cleaned twice in further separators.

The removal of non-magnetic slime has also become an important step in the concentration of these ores and is carried out by flocculating the magnetite contained in cyclone overflow so that it settles rapidly in a hydroseparator, allowing the non-magnetic slime to overflow. The underflow may have to be demagnetized if it is to receive further treatment, and if the unit is placed immediately under the hydroseparator demagnetization also greatly improved the fluidity of the underflow.

Mining Copper at Kilembe

TO have an eventual output of 15,000 tons of blister a year, the Kilembe Copper Mine, in the foothills of the Ruwenzori Mountains, on the Uganda-Congo border, has now been in production for rather more than two years, and plans are well under way to develop the mine to a capacity commensurate with its ore reserves.

Although pre-war prospecting had revealed mineral outcrops in the Kilembe Valley, it was not until 1947 that Frobisher Ltd. resumed exploration and carried out an extensive diamond drilling and development programme which led to the mine being proved. Financing of the project was not completed until 1953, by which time a 208-mile extension of the railway from Kampala to Kasese, in the Ruwenzori Mountains, a necessary prerequisite, had been started.

Located ten miles from the railhead and 1,000 ft. higher, the mine draws power from its own 6,700 h.p. hydroelectric scheme in a neighbouring valley. The potential of low cost power was, indeed, a vital factor in Kilembe's original operating estimates. The power plant, built at a cost of £500,000, has a direct intake from the Mobuku River, and is operated by one European, four Asians, and five Africans. Power is transmitted to Kilembe at 33,000 v. at an operating cost of 1.8 East African cents (0.018 shillings) per kWh distributed.

It was initially planned to open a mine and concentrator with a rated capacity of 45,000 tons of ore a month, the concentrates to be delivered to a filter and drying plant at the railhead by pipeline. Because the 1,000-mile rail haul to the coast precluded the chance of profitably exporting the concentrates, it was decided to establish an electric smelter at Jinja, more than 250 miles away, this type of smelter being dictated by the long rail haul that would have been needed for coal or oil. At the same time, power supplies at the mine were insufficient to serve expansion there as well as a smelter. To make possible the installation of an efficient smelter unit, it was arranged to smelt the sponge copper precipitate from the associated Macalder-Nyanza mine on the Kenya shore of Lake Victoria. Initially, some roasting was done at Kasese, but this was later discontinued when it was found that there was no serious sulphur problem at Jinja.

Mining Methods

The copper-cobalt mineralization at Kilembe occurs in the same stratigraphical horizon in two complex synforms, one on either side of the valley. Two principal economic zones occur up to 40 ft. apart, or in gradational contact with each other, where they are mined as a single orebody. The hanging-wall ore-zone is essentially cupriferous, with a sharp cut-off against amphibolite on the hanging-wall, and an assay cut-off on the footwall. The latter ore-zone is dominantly pyritic, with assay walls. Primary mineralization is mainly chalcopyrite and pyrite, the latter having cobalt in solid solution.

Deposits additional to Kilembe are anticipated and, as well as exploration work on the mine lease, an extensive special prospecting lease is being covered by geological and geochemical field parties.

Because the orebody, as a result of faulting and folding, is extremely irregular in outline, and grade and thickness varies from 4 ft. to 80 ft., with a further complication of a footwall and hanging-wall orebody separated by 20 ft. to 60 ft. of waste, various mining methods will be called for.

Adit mining is still being practised between the 4,500 ft. (above sea-level) horizon and 5,500 ft. Adits can be opened down to the 4,300 ft. level for drainage purposes, but shaft hoisting of ore will be necessary below 4,500 ft.

Open-cast methods are being applied to one block where an initial 250,000 cu. yds. of overburden was stripped prior to production, the present rate of stripping being 1 cu. yd. per ton extracted. Though the "glory-hole" system of working was envisaged for this pit, the heavy rains made flat-bottomed open-cut working necessary.

Under the present system, the ore, broken by wagon drills from 12 ft. high benches, is moved by $\frac{1}{2}$ cu. yd. shovels and 5-ton tip trucks to ore passes that lead through grizzlies direct to loading chutes on the main haulage level. Thence the ore is trammed to the coarse ore bin. Stripping is kept one bench ahead of ore breaking and is done by D8 bulldozers, if necessary with the help of wagon drills, shovels, and trucks.

Sub-level stoping methods are used where conditions permit. The original stopes were laid out with 60 ft. panels and 20 ft. pillars, and with sub-levels at 35 ft. intervals. Very close sample control is necessary within the stopes. Though benching methods were adopted because of the unpredictable walls, experience has engendered some confidence in predicting wall locations and long-hole drilling is now being introduced.

In the section of the mine where the average dip was between 30 and 45 deg. and horizontal width about 80 ft., a transverse sub-level stoping system has been used. The breaking face is carried in retreat from the hanging-wall to the footwall in stope panels 40 ft. wide along strike and separated by 20 ft. pillars. This enables long-hole methods of drilling to be used because this will be to a pillar line and not to indeterminate walls.

Office-planned rock-breaking techniques have had to be adopted because of the inexperience of the labour available. In the more faulted parts, flat-back cut-and-fill stoping with hydraulic sand-filling methods have been successfully employed, except in more shattered ground where a simplified system of timber setting with close sand-filling had to be devised. For the conventional cut-and-fill stoping, the ore passes are 50 ft. apart and discharge into scam drives or directly to loading chutes. For delivering 30 tons of sand an hour to stopes 4,000 ft. away from, and 600 ft. higher than, the mill tailings discharge, desliming is carried out in hydrocones and the 25 per cent solids pulp, thickened to 50 to 60 per cent solids before going into the stopes, pumped to the mine.

Mine tramming is done by 130 cu. ft. Granby-type cars drawn by battery and diesel locos on a 30 in. gauge track.

The Concentrator

Built on benches cut into the hillside, the concentrator has dealt with more than the production target of 45,000 tons of mine ore a month. A bulk float of all sulphides is first made and, after regrinding, differential flotation gives a copper concentrate and a pyrite-cobalt concentrate. From the 400-ton capacity coarse ore bin a 42 in. pan feeder delivers over a 42 in. x 5 ft. vibrating grizzly to the Pegson 20B gyratory primary crusher. Thence the ore passes over a 5 ft. x 8 ft. rod deck screen to a Symons 5½ ft. shorthread secondary crusher, the fine ore being conveyed up to five 900-ton circular steel bins. A washing plant has had to be

installed because of the high proportion of soft ore. Grinding is done in two Allis-Chalmers 8 ft. x 8 ft. 6 in. ball mills.

Both types of concentrates are run in 4 in. pipelines at a rate of 4 ft. to 5 ft. per sec. over the 8-mile fall of 1,100 ft. to Kasese without the aid of a boosting station. The copper concentrates are filtered and dried, and the pyrite-cobalt concentrate is stockpiled pending possible economic use. Drying of the copper concentrates to 4 per cent moisture content is by means of infra-red elements suspended over the conveyor belt. They are then railed to the smelter furnace at Jinja, which is of the three-electrode Electrochemisk 5,500 kVA. type with a smelting capacity of 50 tons a day. Two 10 ft. x 13 ft. converters, a 10,000 cu. ft. three-stage turbo-blower, and a straight-line copper casting machine complete the production equipment.

Because smelter capacity was reduced, when preliminary roasting at Kasese ceased, from an achieved 1,100 tons of blister a month to about 800 to 900 tons, a third converter is being installed to make good the loss. Power for the

smelter is supplied by the Uganda Electricity Board from the Owen Falls Power Scheme at a contract rate based on half-hourly peak readings.

Aptitude tests are used for selecting African candidates for employment, and training facilities are provided.

Not least of the vicissitudes encountered by the Kilembe Mine has been the fact that it came into production just when copper and cobalt prices began to slide. Under these depressed price conditions it became evident that Kilembe could not stand on its present production rate, and it was realized that the programme of several years' development and construction would have to be telescoped into a much shorter period, and plans are well ahead for development of the mine to a capacity commensurate with its ore reserves.

By the end of the current year mining and smelting capacity is expected to reach 60,000 tons of ore per month. Production amounted in 1958 to 10,831 tons of blister. Cobalt concentrates are at present being stockpiled.

Bearings on Trucks and Conveyors at the L.K.A.B. Mines, Sweden

SINCE the first trucks of the Northern Swedish L.K.A.B. mining undertaking were fitted with SKF bearings in 1913, and it was proved that they could stand up to the severe climatic and handling conditions, many modifications and improvements have enabled larger trucks gradually to be introduced, and bearing schemes for mine trucks have now been standardized in Sweden. Larger trucks have, in turn, made possible a reduction of tractive effort required per ton of ore hauled. More and more extensive use has also been made of belt conveyors incorporating a number of different designs of idler fitted with SKF bearings.

The first mine trucks to be fitted with rolling bearings were Norberg trucks and these were equipped with TV housings. The wheels were mounted on a live axle which was carried in fixed bearing housings, and it was possible for both wheels to be shrunk on the axle, though often one wheel was allowed to be free so that it could rotate in relation to the other when negotiating sharp curves. This gave easier running and less wear of tyre and rails, though the wheel hub and axle became worn. Even when plain bearings were fitted to the free wheels, repeated repairs could not be avoided.

To overcome these difficulties, the principle of using free wheels on stationary axles was introduced. The Norberg trucks were rebuilt and each wheel was fitted with two deep groove ball bearings 6212, sealing being effected by labyrinth collars. With a laden weight of 4½ tons and a maximum speed of about 6 m.p.h., these trucks ran on a relatively well-laid track. Leaf springs were subsequently replaced by rubber springing. Some 3/4,000 of these trucks were built, and they gave every satisfaction under very cold and largely out-of-doors conditions.

Following experience with this type of truck, heavier units were gradually introduced. With a load capacity of 10 to 15 tons, and designed for speeds of up to 15 m.p.h., the two-axle Granby truck was introduced at the beginning of the 1920s. At about the same period free wheels mounted on taper-roller bearings came into use, and this design is still thought most satisfactory for mine trucks.

With the large extensions made at L.K.A.B. in recent years, a new automatic-discharge type of truck has been developed. With a weight of 7½ tons and a capacity of 20 to 25 tons, this bogie truck retains the free-wheel principle, but greater stability is achieved by supporting the axles outside the wheels. The axles have extended journals and the wheels are fitted with taper-roller bearings.

To keep down the cost of bearings over the large number of these new trucks involved, the dimensions of the bearings and axle journals were reduced commensurate with the need for long life, and these have now become standard for Swedish heavy-duty truck wheel design. Because rubber springing was unsatisfactory for heavy loads, coil springs are now used. In arriving at a suitable design, the need for easy mounting and dismantling of the wheels was taken into account. Although taper-roller bearings have to be adjusted correctly, this fact was not considered to offer any difficulty since the trucks are always overhauled in the workshops, where they are serviced by experienced personnel. Labyrinth seals, which are not susceptible to wear, are exclusively used, the seals and hubs being completely filled with grease at the time of mounting to prevent dirt and water from entering. As additional protection for the bearings, the wheels are fitted with lubricating nipples to enable regular re-lubrication to be carried out once or twice a year.

Heavy rubber belts are generally used for the extensive system of horizontal and inclined conveyors at L.K.A.B., but for severe conditions rubber-covered steel belts are employed. Many different designs of idler are used, all with stationary spindles and with rollers carried by two single-row deep groove ball bearings. This arrangement is relatively cheap and the idler is easy to assemble. Labyrinth seals, built up from sets of SKF Z-type washers, are used, and each idler is provided with lubricating nipples. Depending on operating conditions, re-lubrication is undertaken from one to four times a year. The driving machinery for a heavy steel belt conveyor is rated at 450 h.p. In addition to the idlers, the driving and take-up drums, motors, and gearboxes are also fitted with rolling bearings.

Technical Briefs

Interaction of Minerals with Gases and Reagents in Flotation

A most interesting and valuable piece of research, carried out at the Institute of Mining of the U.S.S.R. Academy of Sciences, is described in an article by Igor Plaskin. A number of conclusions are drawn.

The effect of oxygen on sulphide mineral flotation has been the subject of a great deal of discussion, and indeed on the effect of other gases opinions differ widely. By comparing flotation, contact angle, measurement of adhesion time, oxygen abstraction, study of the ionic composition of the liquid phase, and measurement of irreversible sulphide-mineral potentials, observations have been made which should aid in the interpretation of the role of gases in flotation. Comparison was made by grinding and classification in oxygen-free atmosphere and floating in deoxygenated water by inert gas or in water with a definite oxygen content (from traces to 20 or 30 mg. per litre).

For example, it has been found that floatability increases with increased oxygen content. The most complete flotation of galena is obtained with water having an oxygen content of 1 to 1.5 mg. per litre, but complete flotation of chalcopyrite requires tens of milligrams of oxygen per litre. Different quantities of oxygen in solution are necessary for various sulphides depending on the activity in relation to oxygen, and the following mineral sequence has been found with regard to increasing oxygen content of the atmosphere in order to attain complete flotation with a collector: galena, pyrite, sphalerite, chalcopyrite, pyrrhotite, and arsenopyrite.

In the case of chalcopyrite, non-floatability is seen in the absence of oxygen, but carbon dioxide improves the flotation. This is explained by decrease in pH, as when it is raised by addition of sodium hydroxide the effect practically disappears. Hydrogen appears to lower flotation, but argon or nitrogen has no effect. Some inherent floatability was noticed in the presence of oxygen.

It is suggested that oxygen action may be in three stages: adsorption, activated adsorption with fixing of the oxygen, oxidation of the surface with oxygen diffusion in the surface layer; and that there are different rates for different minerals, so that the xanthate fixation may take place for one mineral at a stage which represents surface oxidation (and poor or non-flotation) of another.

The influence of oxygen and other gases on the floatability of non-sulphide minerals such as fluorite, barite, calcite, and quartz has also been studied, with unexpected results. Oxygen markedly favours flotation of fluorite, but has no effect on barite, and the writer postulates that the differences are due to the influence of the crystal structure. In a similar way, it is possible to explain why oxygen affects pyrite and arsenopyrite differently.

As a result, three different methods for separating these minerals have been developed, one relying on the effect of oxidizers, the second on the use of lime on previously copper-activated minerals,

and the third, on the use of relatively large quantities of ammonium chloride and lime to favour pyrite flotation and discourage the flotation of arsenopyrite.

NEW USES FOR MOLTEN SALTS

In the field of high-temperature studies for providing materials that will stand up to high-speed flight and the better heat-resistant materials needed for developing nuclear devices, reactors, and related systems, new techniques are being investigated by the Stanford Research Institute, Menlo Park, Calif., United States, to uncover or create new materials.

Among the investigations being made by S.R.I. physical chemists is the study of metals that are soluble in their own salts when the latter are heated above their melting points. In this connection it has been found, for example, that nickel, when combined with molten nickel chloride at a temperature of about 1,800 deg. F., will recrystallize into a purer state, leaving its impurities in the salt solution. Other salt systems are also being studied to determine whether they possess similar properties in the molten state.

From these studies a more practicable method of refining metals or producing new forms may result. In addition, the heat-absorption capacity of the molten salts may make them useful in evaporative cooling applications.

COPPER SULPHATE TEST

B.S. 729 was first published in 1937, to provide a standard method of test for hot dip galvanized and sherardized coatings on articles other than wire. In the revision, B729:1959, the range of articles has been specified with size limitations. It includes bolts, nuts, and other threaded articles of similar size; articles fabricated from strips, bars, or tubes; and castings, angle brackets, and structural shapes. For larger fabricated articles, and for grey and malleable iron castings, a further standard is in preparation.

The copper sulphate test has not been supplanted: it is now presented in a simplified form. Mention is made in an appendix of electronic thickness gauges, which, whilst potentially valuable, are not yet felt to have attained a degree of development comparable with the copper sulphate test.

Copies of this Standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1. Price 3s. (postage will be charged extra to non-subscribers).

SINTERED TOOL SHANK MATERIAL

Johnson, Matthey and Co. Ltd. announce that they are now producing and marketing in Britain, Mallory No-Chat, a sintered tool shank material possessing remarkable characteristics that have

gained it wide acceptance in precision machining in the United States. No-Chat has a modulus of elasticity of 40×10^6 lb./sq. in., a density of 16.96 gm./cc. (0.606 lb./cu. in.), a coefficient of linear expansion (100 to 200 deg. C.) of 5×10^{-6} per deg. C. together with an ultimate tensile strength of 112,000 lb./sq. in.

From these data it will be seen that there are definite advantages over steel as a tool shank material. There is a higher modulus of elasticity, and hence greater rigidity, and these properties, combined with the high density and inherent vibration-damping capacity of the material mean that tools with shanks fabricated from No-Chat will produce better surface finishes than steel shanked tools of identical size, with a minimum of chatter. Moreover, because of the reduced tendency to chatter, tool tip life is considerably increased even in the most rigorous conditions of service. Optimum results with tungsten carbide tools are obtained by using high speeds with deep cut and light feed, and by employing tools with No-Chat shanks each of these factors can be increased.

SPHALERITE FLOTATION

It has been shown in tests using Bunker Hill ores, according to R. R. Hines, that diphenyl guanidine is a good collector for sphalerite, giving a better recovery of both sphalerite and marmatite, with a higher grade concentrate than potassium ethyl xanthate.

VOLATILIZATION OF TIN CHLORIDE FROM BOLIVIAN SLIMES

Following the United States policy of investigating strategic minerals, the U.S. Bureau of Mines have been conducting fundamental studies of the recovery of ultra-fine mineral values, and attention has been given to tin, as significant losses of this metal occur during mineral dressing in Bolivia, and huge clumps of slime exist which contain substantial amounts of tin. Previous work led to the development on a laboratory scale of low-temperature chloride volatilization for recovering tin from catarric slime. The good results led to the decision to continue experimental work on other Bolivian tin-ore slimes using larger charges.

In this recent work, high percentages of the total tin were volatilized as chlorides at temperatures below 600 deg. C. Owing to the low temperature and high recovery (often 95 to 98 per cent), the process was considered to have possibilities on a commercial scale. Samples treated contained from 0.5 to 2.33 per cent Sn, and the tin was volatilized by hydrogen chloride in a reducing atmosphere provided by hydrogen. Under optimum conditions, the reaction rate was relatively rapid, but ferric oxide tended to react with the hydrogen in competition with the cassiterite.

MINING MISCELLANY

A modern laboratory, devoted to developmental work on neoprene and other synthetic rubbers and rubber chemicals for the European rubber industry, has recently been opened by the Du Pont Co. (United Kingdom) Ltd., at Hemel Hempstead, 25 miles north-west of London.

In allocating 53 per cent of this year's budgetary expenditure to economic development, Albania is to give highest priority to geological prospecting, especially for chrome ore and oil.

It is reported that a coal combine team of 70 in the Zarubek mine in the Ostrava-Karvina coalfield, Czechoslovakia, celebrated May Day by breaking the world record for monthly coal output in low seams, established by themselves in January of this year, when they produced 11,506 tonnes. Their output in April was 11,791 tonnes.

Uranium has been found in Rajasthan. Foreign experts who examined the areas were of the view that the geological structure indicated large reserves.

Under the terms of an agreement concluded in February, the Soviet Union will render aid to the Mongolian People's Republic in geological prospecting of the northern part of the latter country, a credit being granted on favourable terms to cover the expense involved. In the meanwhile, it is reported from Ulan Bator that the Nalayha coal mine, the largest in Mongolia, has exceeded its target for the first quarter of this year (the amount of which is not stated) by 10,000 tonnes.

The Minister of Steel, Mines, and Fuel for India, has announced the government's decision to take up the briquetting and carbonizing section of the Neyveli Lignite Scheme (near Madras). He said

that the Lignite Corporation would shortly issue a global tender for the supply of plant, machinery and equipment, and that it was hoped that the scheme would go into operation by about the middle of 1962, to synchronize with the completion of the thermal power station and the fertilizer scheme.

It was reported in February that new deposits of iron ore of a high quality had been discovered in the province of Tacna, in southern Peru.

At the Keciburlu mines in western Turkey, sulphur production has been doubled from 6,000 tonnes in 1950, to 12,825 tonnes in 1958.

The iron ore mine of Söftestad in southern Norway has been closed recently for lack of a market for its phosphorus lump iron ore.

A newly-formed group organized by North Rankin Nickel Mines and ten private subscribers recently launched a new venture in Arctic exploration. The first target area for exploration is the western shore of Hudson Bay. Arrangements have already been made with Canadian Aero Service and the Hunting organization, to map from the air and check geophysically a 1,000 sq. mile area.

Exploration activities of Canada's McIntyre-Porcupine Mines Ltd. will be expanded this year, Mr. J. D. Barrington, president, said at the annual meeting held in Toronto recently. He added that the company must maintain an aggressive search both by investment research and exploration, if it is to prosper.

Andres Andai, president of the Sante Fe Mining Co., said that negotiations were going on with Bethlehem Steel Corp., and other undisclosed foreign

firms, to develop a large iron ore deposit in Chile. The deposit, known as El Laco, is in Antofagasta Province, near the Andes Mountains in northern Chile.

Details of a multi-million dollar development plan which could make Newfoundland the world's largest producer of iron ore have been disclosed by Mr. J. R. Smallwood, Premier. He told the Provincial Legislature that the Iron Ore Company of Canada and Wabush Iron Ore Company, both working large Labrador concessions, would build separate plants to turn out a total of 80,000,000 tons of iron ore concentrates a year. Capital outlay, including the cost of building two towns, would be more than \$400,000,000 (£147,000,000). Wabush Iron planned a concentrating plant in the Wabush area to handle 12,000,000 tons a year, and a town to accommodate about 5,000 people, while Iron Ore Co. hoped to build a plant with a 6,000,000-ton capacity in the same area, as well as houses for about 4,000 people. Canadian Javelin have discovered reserves of 1,000,000,000 tons of low-grade iron ore in the area.

According to a recent announcement by the Venezuelan Ministry of Mines and Hydrocarbons, substantial tungsten deposits have been found in the Botanamo (El Callao) mining area, Bolivar State. The zone has been declared a national reserve zone for a period of two years in order to prevent private claims being made before the Ministry has ascertained the value of the new deposits.

Large deposits of copper ore have been discovered in the northern Urals beyond the Polar Circle, states *Pravda*.

Adriatic Petroleum Corporation has been undertaking an 8,000 sq. mile airborne magnetometer survey in Italy. Flying was to be completed by mid-May.

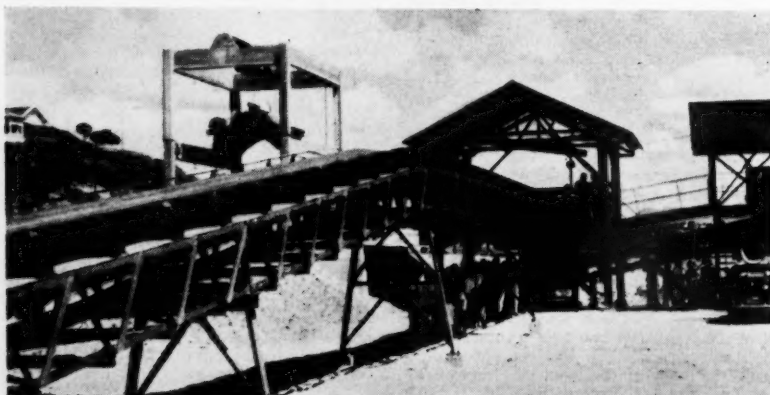
Mr. L. C. Thiess, governing director of Thiess Bros. Ltd., Australian coal suppliers, has left for Japan in an attempt to interest Japanese capital in the development of the Kiang coalfield in central Queensland. The Queensland State Railways have offered to haul the coal at a low concession rate if firm export orders can be obtained.

Brazil is to buy 3,000 tons of tin annually from Bolivia. Details of the agreement are as yet unknown.

A group of 11 Yugoslav engineers are to undertake lead and zinc prospecting at Al Qoseir on the Red Sea on behalf of the United Arab Republic.

Perak, at present the leading tin-producing State in the Federation of Malaya, is now to become a major producer of iron ore, according to a statement by a spokesman of the Ipoh Mining Co. Ltd. He estimates iron ore reserves in the State at 5,000,000 tons. At present, three companies are operating iron ore mines in Perak, with a combined annual output of some 500,000 tons. Last year, overseas exports totalled

On April 7 a new automatic loading installation was brought into operation by the Companhia Vale do Rio Doce S.A. at the Paul Quay in the port of Vitoria (Brazil). The new installation is reported to have a loading capacity of about 900 tons per hour. The ore is carried in a belt conveyor over an automatic weighing machine to a loading tower which is mounted on rails, making any moving of the ship unnecessary. The Paul Quay installation is working in addition to the existing automatic installation, so that there are now two fast loading berths at the port of Vitoria



200,000 tons. The Ipoh Mining Co. Ltd. has completed an agreement with a group of Japanese steel mills to ship 170,000 tons of iron ore to Japan in the year commencing April 1, 1959. It is also announced that eight Japanese mills will between them take 570,000 tons of iron ore from Perak alone during the same period.

Iron ore reserves claimed to be far greater even than those at Magnitnaya, in the Urals, have been discovered at Mount Kachkanar, in the central Urals. With the most intensive exploitation, these will last, it is reckoned, for at least a hundred years. An ore-dressing plant larger than any yet constructed in the Soviet Union is being constructed in the adjacent foothills.

On April 30, a big new ore-crushing system went into operation at Paiyunopo iron mine, about 100 miles north of the integrated iron and steel works at Paotow, in Inner Mongolia. This completes the mechanization of the Paiyunopo mine, major supplier of ore for Paotow, which is now one of the most up-to-date open-cut iron mines in China. The ore-crushing machines were supplied by the U.S.S.R., but a significant proportion of the machinery has been made in China.

Queensland Mines has been registered with a nominal capital of £A3,000,000 to test uranium leases in the Mount Isa district.

PERSONAL

Sir Josiah Eccles has been appointed president of the Electrical Development Association for the year 1959-60. Mr. A. W. Ferguson and Mr. John Mould are appointed vice-presidents for the term 1959-62. At the first meeting of the Association's newly constituted council, Mr. T. E. Daniel was elected chairman for the year 1959-60, and Mr. D. B. Irving vice-chairman.

Two appointments in the West Midlands coalfields are announced by the National Coal Board. Mr. H. J. Widdowson, area general manager of the Board's Cannock Chase area since 1954, has been appointed area general manager of the North Staffordshire area. Mr. F. L. H. White, area production manager of the Cannock Chase area since 1948, is to become area general manager of Cannock Chase area.

Mr. W. E. Hosking, M.I.M.M., has been appointed a director of Kinta Tin Mines Ltd.

Mr. G. R. Mitchison and Mr. J. M. Mitchison resigned from the board of Puket Tin Dredging Ltd. on May 13, 1959. Mr. John Ryan and Mr. John Carl Ross were appointed to the board on May 13, 1959.

Dr. W. Betteridge has been appointed superintendent of the Platinum Metals Research Laboratory of the Development and Research Department, the Mond Nickel Co. Ltd., Acton.

Dr. W. Steven, superintendent of the Development and Research Department Laboratory of the Mond Nickel Co. Ltd., in Birmingham, is being transferred to the Development and Research Division



The Nant-y-Moch contract site, in Cardiganshire, which forms part of the Rheidol hydroelectric scheme in Central Wales. The contract is valued at £3,000,000. The Cementation Group of Companies is undertaking the work on behalf of the Central Electricity Generating Board. Pictured are delegates to the Cementation Management Conference viewing the site

of the International Nickel Co. Inc., New York, as director of research. He has also been elected an assistant vice-president of that company.

Mr. W. B. Spencer, general manager of the Contractors Plant Dept. (Southern Area) of Thos. W. Ward Ltd., has relinquished the position on medical advice. Mr. Spencer will, however, continue to act in an advisory capacity.

Mr. J. M. Williams, the recently appointed London director of Holman Brothers Ltd., Camborne, Cornwall, has returned from South America, where he has been making a three-week tour, starting at Caracas, Venezuela, and continuing into Brazil and Argentina.

Dr. A. Roberts, director of the Postgraduate School in Mining at the University of Sheffield, is to visit the University of Minnesota, as Visiting Professor in Mining Engineering for the duration of the academic year commencing September, 1959. While in the United States, Dr. Roberts will visit mining centres and university mining schools. He is to present lectures and course work at the University of Minnesota on mine plant engineering, with some emphasis on his speciality of mine environmental studies. In addition, he is to direct the establishment of the mine plant laboratories, in the newly-completed School of Mines building at Minneapolis, and take part in the direction of graduate students and mining research activities.

A new publication will contain English language abstracts of all new Russian patents and invention certificates arranged under ninety-one class headings. The first issue will appear in June. The publishers are Technical Information Co., Chancery House, Chancery Lane, London, W.C.2.

AGENCIES WANTED

The firm of Hans Fehr, Kranbau, Dietlikon, Zurich, have informed the British Consulate-General at Zurich that they seek a United Kingdom agency for track-driven loaders. Suppliers interested in this agency inquiry should write direct to the Swiss company, at the same time notifying the British Consulate-General, Dufourstrasse 56, Zurich, that they have done so. Ref. ESB/30548/58. Telephone inquiries to Chancery 4411, extension 776 or 866.

Paragon Supplies Ltd., 895 East Hastings Street, Vancouver, B.C., have informed the U.K. Trade Commissioner at Vancouver that they wish to obtain an agency for a line of United Kingdom manufactured rubber conveyor belting. Manufacturers interested should write to the managing director, Mr. A. W. White, notifying the U.K. Trade Commissioner, the Mercantile Bank Building, 540 Burrard Street, Vancouver 1, B.C., that they have done so. B.O.T. Ref. ESB/11548/59. Telephone inquiries to Chancery 4411, extension 776 or 866.

CONTRACTS AND TENDERS

India

Fine coal washing pilot plant. Ref. ESB/3706/59. The closing date for the receipt of bids has been further postponed to June 30, 1959. Telephone inquiries to Chancery 4411, extension 738 or 771.

India

Diamond core bits, reaming shells, and core barrels. Issuing authority, Director-General of Supplies and Disposals, Shahjahan Road, New Delhi. Tender No. SE-7/1216-K/1217-KIV. Closing date, 9/6/59. B.O.T. Ref. ESB/11723/59. Telephone inquiries to Chancery 4411, extension 738 or 771.

An urgent telephone call from the Belgian Congo, some 4,000 miles away, to the Wolverhampton factory of the Goodyear Tyre and Rubber Co. (Great Britain) Ltd., requesting twenty Goodyear 18.00 x 25 hard rock lug earth-mover tyres, set into action a high-speed air and water lift.

Within a few hours of Goodyear receiving the order from their offices at Leopoldville, the tyres—wanted urgently for a civil engineering project operating on land development at Elizabethville—were on the first leg of their journey to the Belgian Congo. A charter aircraft made two trips from Elmdon airport, Birmingham, to Antwerp, and at Antwerp the tyres—their total weight some 6 tons—were transferred to a waiting ship bound for the Belgian Congo port of Matadi. On arrival there, they were immediately transferred to a waiting plane for the final stage of their journey to Elizabethville. By normal methods the trip would have taken five weeks, but the combined air and water lift ensured the tyres arrived on time—in just under twenty days.

Metals and Minerals

Magnesium In Growing Demand

The upward trend in United States demand for magnesium, as reflected in rising shipments of mill products and castings since early last year, shows no signs of abating. Although the uptrend has been steady, the rate of increase has not been large enough to indicate any increase in the production rate of primary metal until later in the year, when a second primary producer expects to enter the field. Present rate of production of new metal in the United States, though below 2,000 tons a month, is under demand levels, but is regarded as ample in view of existing plant inventories of primary ingot.

Meanwhile, the primary aim of the magnesium industry is to accelerate the rate at which demand for its products is rising. The major effort will be directed at increasing commercial, or non-military, types of uses. In this connection, it will be recalled that much of the past growth in magnesium uses for commercial purposes stems directly from the initial use of this metal, both directly and indirectly, for military needs. Since the end of World War II, however, commercial requirements have been catching up. Last year, military usage is estimated to have accounted for not more, possibly a little less, than 50 per cent of overall consumption.

Since it represents a good volume field, a substantial portion of the industry's selling effort will be directed towards expansion of the use of magnesium mill products, especially plate, for tooling purposes. A major target will be the reviving motor car industry, where considerable progress in this direction has already taken place. Magnesium tooling is being used to some degree by most United States motor car manufacturers, particularly in such applications as frame jigs and fixtures, where weight can be quite an important factor. The fact that the influx of various types of missile work into Detroit has attracted engineers with aircraft experience—which includes familiarity with magnesium—should assist in speeding up acceptance of this metal for tooling and other purposes.

Indicative of the increasing interest in magnesium as an important material for the space age, as well as for conventional aircraft, is the announcement that a major California producer of missiles has employed an Eastern company to produce components in a new magnesium alloy known as EK31XA. The quantity production of castings in this high thermal alloy has already been started.

Made by alloying magnesium with didymium (3.2 per cent) and zirconium (0.6 per cent), this new material is described as offering to aircraft and missile designers double the strength of many light alloys at 500 deg. for airframe and electronics components. It is expected to broaden the market for magnesium producers, foundries, and fabricators.

E. J. Lavino and Co. have announced plans to build a plant at Freeport, Texas, for the production of high-grade magnesite (periclase) a component of their refractory products. Dow Chemical will

supply Lavino with magnesium hydroxide from their regular production at Freeport, which will be delivered by pipeline to the nearby Lavino plant.

ALCOA'S PROSPECTS

Last week we reported that Alcoa was to step up its production of primary aluminium by 40,000 tons a year through reactivation of two idle potlines. It has since been announced that, in anticipation of a general increase in business over 1958, the company has programmed 1959 pig aluminium production at about 624,000 tons—some 20 per cent more than last year's output. This total includes output from the two potlines started up last week, which moved Alcoa's operating rate up to 82 per cent of its 798,250 t.p.a. installed capacity. The president, Mr. Frank L. Magee, stated a few days ago that the company would be operating some other currently idle potlines, "with a corresponding increase in profits", if it were not obliged to take quantities of metal from Canada under contracts drawn up in the Korean War emergency.

Excluding deliveries to the United States Government stockpile, the company's sales last year totalled 269,500 tons in the first half and 305,800 tons in the second half. No projects in the original \$600,000,000 expansion programme announced three years ago have been eliminated or reduced, although some completion dates have been extended and other projects have been added.

Lower prices continue to be reported in the United States for imported aluminium products, which, however, account for only some 2 per cent of United States consumption. Imported aluminium rods, for instance, were sold for 50 c. per lb. against 58 c. asked by American producers until last February, when the United States mills met the lower rate. The foreign suppliers have since cut their rods down to 44 c. per lb. United States traders anticipate heavier imports through the new St. Lawrence Seaway.

The Sumgait Aluminium plant, set up in Azerbaijan four years ago, is to have its output increased by 240 per cent over the next seven years, the second and third sections of the plant being put in operation by the end of this year, ahead of time. Prospects are regarded as favourable for a further expansion of aluminium production in the Republic, since large deposits of bauxite have been located in the spurs of the Lesser Caucasus Range, and are to be mined commercially in the course of the next few years. A large plant now under construction at Kirovabad will process the raw material and send it on to Sumgait.

World production of bauxite in 1958 showed a slight increase over the previous year, according to the latest estimate by the Bureau of Mines, U.S. Department of the Interior. Marked decreases occurred in the outputs of British

Guiana, Surinam, Yugoslavia, and the United States, but were more than offset by increases in the production of Jamaica, Ghana, France, Hungary, and the U.S.S.R.

Total world production is estimated at approximately 20,370,000 tons in 1958, as compared with 19,950,000 tons during 1957. For the first time, bauxite was produced in Sarawak. Production in the North American area amounted to 7,151,000 tons, of which 1,311,000 tons were mined in the United States and the remainder in Jamaica and Haiti. South American production declined from 5,433,300 tons in 1957 to 4,324,000 tons last year. Output by the European nations increased from 6,980,000 tons to 7,564,000 tons, spearheaded by substantial increases in France, Hungary, and Russia. An increase was also reported from Africa, where production rose from 550,600 tons to 631,900 tons. The largest producing countries in 1958 were: Jamaica, 5,500,000 tons (4,643,200); Surinam, 2,816,000 (3,323,700); Soviet Russia, 2,710,000 (2,410,000); France, 1,940,000 (1,653,500); British Guiana, 1,420,000 (2,021,000); United States, 1,311,000 (1,416,200); and Hungary, 1,000,000 (903,000).

WEAK CHROMITE MARKETS

Although there is always a certain amount of buying interest in the chrome ore markets, it is generally of a hand-to-mouth nature involving small lots, and supplies remain readily available.

Turkish ore prices have continued to ease, and for 48 and 46 per cent material three-to-one ratio (lump and concentrates) a range of \$40 to \$42 per ton c.i.f. respectively is mentioned. Recently the Turkish authorities decided to assist the industry by granting an export premium of £T6.2 for chrome exports. Turkish exports have been falling for some time, stocks are rising sharply, and some companies have been forced to suspend operations. The view has been expressed that the United States, which is traditionally a big buyer of Turkish ore, has been showing little interest because of the uncertain future labour situation in the steel industry.

Russian competition is still being experienced in a number of directions. In so far as Europe is concerned, this is being felt particularly in the Scandinavian countries.

The chrome-for-wheat barter deal with the United States of 14,000 tons of United States wheat for South African chrome ore has at last been completed.

ITALY SUSPENDS MERCURY TAX

A decree providing for a three-year suspension of the manufacturing tax and the corresponding frontier surcharge on mercury ores and derivatives has been published in the Italian Official Gazette. The decree is retroactive to February 1, 1959. Suspension is also applied to mercury metal which entered government-

authorized warehouses before January 31, 1959.

The tax, which was instituted in November, 1954, was 32,000 lire per flask of 34½ kg. of mercury metal and 800 lire per kg. of mercury metal contained in the crude ore and mercury metal lines extracted by mines and plants.

Presumably the suspension of this tax will shortly be followed by a resumption of Italian quicksilver exports at competitive world prices. After holding its export price for a long period at £80 per flask f.o.b., Italy has lately shown signs of adopting a more flexible selling policy. In the first two months of this year, she exported 77.7 tonnes of mercury compared with 46.6 tonnes in the corresponding months of last year and with 393.2 tonnes in the whole of 1958.

Mercury is currently quoted in London at £77 10s. per flask ex-warehouse.

The Palawan Quicksilver Mines Inc., sole mercury producer in the Philippines, is now capable of treating approximately 75,000 tonnes of ore a year and producing about 350 flasks of mercury a month. The company now has three kilns in operation.

TELLURIUM'S USES GROWING

Reports from the U.S. state that the tellurium demands for lead alloys and also in the rubber and grey iron industries are increasing. There is also a bright potential for tellurium use in the new techniques now being developed by Westinghouse and Carrier, for conversion of heat directly into electricity by the thermocouple principle. Tellurium may also be used in the new type of refrigerator, which has no moving parts. There are now about five producers of tellurium in the U.S. Peak production was in 1957 when output reached 254,865 lb.

The American Smelting and Refining Co. recently posted a price increase on tellurium powder, from \$1.65 to \$2 per lb. in 100-lb. lots.

A.E.C. TO CLOSE URANIUM PLANT

The U.S. Atomic Energy Commission has announced that it will close the only Federal-owned uranium ore plant about January 1, 1960. The plant, which is situated at Monticello, Utah, is operated by National Lead under an A.E.C. contract, and has a capacity of about 300 t.p.d., which is about the minimum economic operating rate. However, according to the announcement, deliveries have averaged only about 100 t.p.d. in recent months. To keep the plant operating, A.E.C. would have to buy more than its schedule of uranium purchases actually required, thereby adding some \$4,000,000 to annual uranium expenditure.

HIGHER ASBESTOS SHIPMENTS

According to the Philadelphia organ, *Asbestos*, first-quarter shipments of asbestos fibre during 1959 indicate a rise of approximately 11 per cent over those for the corresponding period of last year. This increase, which is attributed mainly to general improvement in both the domestic and foreign markets, is regarded as most encouraging. It is expected that second-quarter shipments will exceed those of 1958 by roughly 15 per cent, but they will still remain approximately 5 per cent below those of 1957. All grades are still in ample supply.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

The market has been quiet during the past week, and the intervention of the Whitsun holiday has reduced the volume of business, but in spite of this prices generally have made a very satisfactory showing.

COPPER FIRMER ON STRIKE FEARS

Renewed fears that a strike will materialize in the United States in the middle of this year brought about a sharp improvement in demand for copper during the week for customs smelter metal at 32 c., with sales reported up to 32½ c., but, owing to the recent light offerings of scrap, supplies are not plentiful. Dealers are reported to have obtained up to 33 c. for their material. Producers continue to report good business, with June metal virtually sold out. The firmer undertone resulted in the scrap price advancing ¼ c. to 26½ c. at the end of last week, at which level offerings were satisfactory. An advance has also taken place in the Commodity Exchange futures market.

The London Metal Exchange closed for the Whitsun holiday after the morning session on Friday, but when business was resumed on Tuesday the market immediately moved higher to reflect the latest developments in the United States situation. Demand from the Continent is not impressive, although reports were circulating that the Eastern bloc had been showing a little interest. It is not known, however, whether any business has actually been concluded. Stocks in official warehouses increased 350 tons to 11,266 tons, but the contango rate has shown no alteration.

During the week the Miami Copper Co. announced that it will curtail its mining operations next month. A further assurance has been given to the U.S. Senate that no copper from the Defence Production Act inventory will be sold. The most recent developments at the Butte property of the Anaconda Copper Co. is a ruling by the U.S. Court of Appeals which, in effect, makes possible strike action by employees of the company's railway subsidiary.

TIN STEADY

The tin market has been quietly steady following a moderate improvement in the United States and Continental demand during the week. Stocks in United Kingdom warehouses declined last week 295 tons to 8,227 tons. Shipments from Singapore in the first half of May totalled 6½ tons, compared with 9½ tons in the first half of April and 503½ tons a year ago. Comparative figures from Penang were 2,210½, 1,058½, and 1,026½. Total exports of tin metal from Malaya during April amounted to 2,544 tons compared with 3,960 tons in March. On Thursday morning, the Eastern price was equivalent to £811½ per ton c.i.f. Europe.

LEAD-ZINC PRICES RESPONDING TO CUTS

Lead and zinc values have been well maintained during the week, mainly as a result of continued good demand in the

United States. As far as lead is concerned, the 12 c. price is steady and the undertone of the market firm. The majority of orders being placed with producers are on this price basis for delivery this month and next, rather than on the price ruling at time of delivery. A better demand for manufactured lead products has been at the back of the market, whilst inventories and scrap offerings are both at a low level.

Although a higher United States zinc price has been expected by the trade, it seems that any action will await developments in the current steel labour negotiations. Demand from the steel industry for zinc for galvanizing purposes has been exceptionally good recently, but it must be borne in mind that if, in fact, a strike does develop in the steel industry in the middle of the year, this major outlet would be closed, at least temporarily.

Lead production from ores mined in the United States in March at 21,129 tons was 221 tons less than in February, whilst zinc production showed an increase at 36,090 tons compared with 35,709 tons.

Special high-grade metal has been in good demand from the car industry. In the United Kingdom, both lead and zinc demand are considered satisfactory, with the latter particularly being on a better scale. Favourable comment on the outcome of the recent U.N. Conference on lead and zinc continues from the main producing centres. The Canadian Trade Minister, for instance, has confirmed that Canadian production cut-backs will result in exports being reduced by 9,000 tons of lead and 30,000 tons of zinc in 1959. As far as zinc is concerned, the expected world surplus should be cut to 16,000 tons from the 120,000 tons previously forecast. In the case of lead, however, the outlook is not so satisfactory, as the surplus will still be running in the region of 104,500 tons in spite of production cut-backs of some 45,500 tons.

United Kingdom statistics published during the week give the following information:

	March tons	Feb. tons
Copper consumption	47,431	48,293
Stocks	72,946	65,875
Lead consumption	26,691	25,968
Stocks	42,761	40,535
Zinc consumption	27,243	25,676
Stocks	38,457	36,850
Tin consumption	1,773	1,614
Stocks	13,214	14,715

Closing prices are as follows:

	May 14 Buyers Sellers	May 21 Buyers Sellers
COPPER		
Cash	£233½ £233½	£238 £238½
Three months	£234½ £234½	£237½ £238
Settlement	£233½	£238½
Week's turnover	9,225 tons	6,775 tons
LEAD		
Current ½ month	£71 £71½	£70¼ £70½
Three months	£72 £72½	£71½ £71½
Week's turnover	15,375 tons	4,875 tons
TIN		
Cash	£784 £784½	£784½ £785
Three months	£784½ £785½	£785 £785½
Settlement	£784½	£785
Week's turnover	780 tons	800 tons
ZINC		
Current ½ month	£77½ £77½	£77½ £77½
Three months	£75½ £76	£75½ £75½
Week's turnover	6,900 tons	6,075 tons

London Metal and Ore Prices appear on inside back cover.

Mining Finance

De Beers Trumps Artificial Diamonds

Although total diamond sales in the March quarter of this year broke all-time records, De Beers were at great pains to point out that the level of industrial sales had been inflated by a massive barter deal for the U.S. stockpile and that this was unlikely to recur. In his statement to De Beers' shareholders, Mr. Harry Oppenheimer repeats this warning. Demand, he says, is at a satisfactory level, but this is to a considerable extent due to the resumption of stockpiling. Generally speaking, production of industrial stones is running ahead of requirements for current consumption.

This emphasizes the significance of the latest developments in the competition between natural and synthetic stones. Last year De Beers inaugurated a series of large-scale tests designed to compare the properties of natural and synthetic boart in various grinding operations. Widely differing results have been obtained under varying conditions, but it appears that the natural stone is superior to the synthetic in metallic-bonded wheels, while the synthetic may be better in applications requiring resinoid-bonded wheels.

Knowledge of a competitor's strengths and weaknesses is only valuable in so far as the knowledge can be exploited. De Beers have lost no time in following this principle, and, as a result of the tests, the company will shortly be in a position to market a new diamond grit specially prepared for resinoid-bonded grinding wheels.

The General Electric Co.'s competition is, of course, of limited significance to De Beers itself. De Beers' output consists, in the main, of gem stones and the larger types of industrials, and there is no prospect of synthesizing these grades for many years. In financial terms, De Beers' sidestake in the present rivalry is limited to the commission earned by the Central Selling Organization on its board sales, on behalf of such producers as the Société Minière du Beceka, who co-operated in the comparative tests. Events of more immediate significance to De Beers' shareholders in the past year have been the purchase, in partnership with the Tanganyika Government, of the Williamson Mine at Mwadui, and the continued difficulties with illicit diggers in Sierra Leone. Mr. Oppenheimer's remarks concerning these

matters are to be found on page 568.

Although De Beers is synonymous with diamond production in the public mind, more and more importance has been attached to diversification in recent years.

Aspects of this successful policy are the partnership with I.C.I. in African Explosives and Chemicals, which owns the largest non-military explosives plants in the world, and the growing portfolio of young South African gold mines.

Last year marked a milestone in this field. At the year-end, the total value of De Beers' non-diamond interests, added to the vast cash and quasi-cash assets, reached a total of more than £100,000,000 for the first time. The growth in this sector of the company's activities, both past and in prospect, must add strength to the contention that the time has come for De Beers to be more generous to its shareholders, especially since diamond sales appear to have pulled out of the recession trough. Great financial stability is essential to a company acting as the main buttress of a sensitive industry, but to achieve this at the expense of a dividend unchanged for six years looks over-cautious.

LONDON MARKET HIGHLIGHTS

The South African gold share market opened after Whitsun in a much brighter mood. A good demand was met with from Johannesburg and much of this was thought to be of U.S. origin. At the same time Paris reversed her previous tendency to sell Kaffirs. The result of all this was that the *Financial Times' Gold Share Index* climbed to 91.4, its best since February, 1956.

A sudden revival in Libanon to a five-year high of 11s. 7½d. had a transatlantic feel about it, as did the rise to 131s. 3d. in West Driefontein. Also prominent were St. Helena which advanced to 59s. 4½d.; the annual meeting with its news of good values in the No. 2 shaft left observers with the feeling that this mine may well turn out to be a much higher-grade proposition than had previously been thought likely. Among the many other price gains, Free State Geduld at 180s. 7½d. showed a return to favour and "Ofsits" (99s. 9d.) mirrored the chairman's optimism about future prospects in the annual report.

Finance shares were not left out of the upward movement. Among them, Anglo American reached 183s. 9d. in anticipation of the annual report which is due shortly. Meanwhile, the appearance of the De Beers report made a good impression on all shares in the Diamond section. De Beers themselves advanced several shillings to 141s. 3d. on Mr. Harry Oppenheimer's views of next year's prospects. "Casts" improved to 20s. 3d., in spite of the fact that the forecast of a total payment for the year of "at least" 3s. accompanying the in-

terim was considered by some to be disappointing.

Lead-zinc shares reflected the better feeling about prospects for the twin metals. Consolidated Zinc jumped to 66s. 6d. Rhodesia Broken Hill surprised many jobbers who had little stock available with a sudden spurt of 1s. to a two-year high of 10s. 1½d.

End-Account influences subdued Copper shares on Tuesday, but the market brightened later. A feature was the persistence of investment demand for Chartered (92s. 6d.). Tins looked as if they were going to follow the same pattern, but the market took a sharp tumble on Wednesday. Ayer Hitam fell 1s. 6d. to 36s. and several others were up to 9d. cheaper by the end of the day.

An intriguing feature elsewhere was the sudden revival of activity in the shares of Retia Phoenix. For most of its career the company has been associated with gold mining in Peru. Mining activities ceased in 1937 and since then the company's interests have been confined to investments. From a nominal price of 3d. a week ago the 1s. units rocketed to 5s. 1½d. at one time. This prompted the chairman to issue a statement to the effect that he could not understand the reason for the activity. But even this did no more than lower the units to 4s. There may be some substance to the theory that a large block of them has been acquired by outside interests and that the "shell" of Retia will be used to embark on a completely new line of business.

OFsITS, AMITS AND WRITS

The investment companies of the Anglo American group follow the commendable practice of issuing an unaudited profit statement very soon after the end of the financial year. The salient features of Ofsits', Amits' and Writs' accounts have, therefore, been common knowledge for some four months, and interest in the newly-published reports centres on the advance statements by Mr. Oppenheimer, who is chairman of all three companies.

The fortunes of Orange Free State Investment Trust and of the West Rand Investment Trust are, of course, intimately bound up with the progress of work on the mining fields after which the companies are named. In both cases Mr. Oppenheimer paints a cheerful picture—with good cause. Gold output in the Orange Free State during 1958 rose by almost 600,000 oz. to 4,329,411 oz.—about one-quarter of South Africa's total production, yet the limit has by no means been reached.

All output to date in the O.F.S. has been based on 21 working shafts. Since the beginning of 1957, a further six shafts have been commissioned, while nine more are in varying states of completion. No benefit in terms of output has yet accrued from these fifteen shafts, so that measured in these terms, the capacity of the O.F.S. goldfield in 1961 should be 70 per cent higher than in 1957. This is justification enough for the present level of Ofsit shares, currently quoted at 98s. 3d. to yield just over 4 per cent. The situation of Writs is similar, with the proviso that most of this company's investments are nearer maturity than those of Ofsits.

Amits is quite a different kettle of fish. The investments of this company are concentrated upon the diamond industry, and in particular De Beers. Shareholders of this trust will find much to interest them in Mr. Oppenheimer's statement to De Beers on page 568.

NEW EDITION OF O.F.S. BOOKLET

Of especial interest to Ofsits' shareholders is the publication by Anglo American of a new edition of *The Orange Free State Gold Field*. This is an excellently produced booklet summarizing the history of the field from 1904, when Arthur Megson sank a pit on the farm Aardenk 227, until 1958, when Welkom had become a town with a population of 88,000, a municipal valuation of £27,000,000, and one car for every 2.6 Europeans.

Anglo American has also published a booklet on the Ernest Oppenheimer hospital at Welkom, describing in some detail its history, its equipment, and its services for Native patients. Both booklets are available from the Corporation at 40 Holborn Viaduct, E.C.1.

TWO KLERKSDORP BARGAINS

The bulk of General Mining's investments in the Stilfontein, Hartbeestfontein and Buffelsfontein mines in the Klerksdorp area are held through the portfolios of New Pioneer, East Rand Extensions and Southern Van Ryn. The publication of the E.R. Ex. and S. Van Ryn annual reports gives an opportunity to compare these companies as investments.

At the year-end, both balance sheets were showing substantial increases in the market values of investments compared with the previous year. S. Van Ryn's shareholdings had risen in value by more than £300,000 to almost £2,000,000, while those of E.R. Ex. were £265,000 up at £1,791,580. Adding net current assets and unquoted investments, the asset value of S. Van Ryn at the year-end was some 9s. 8d. per share, compared with a current market price of about 8s. 9d., and that of E.R. Ex. was about 30s. 1d. compared with 32s. 9d.

On an asset valuation, therefore, Southern Van Ryn appear to be a cheaper buy than East Rand Extensions—cheaper, indeed, than the underlying shares. The main reason for this is, of course, E. Rand Extensions' 50 per cent interest in the Vermeulenskraal and Video farms which are about to be re-drilled. Basal Reef was found to underlie the area when drilling was originally carried out in 1945.

The choice for investors, therefore, is between a cheap investment in the three Lucas Block mines via Southern Van Ryn, or a slightly dearer investment in the same mines with a speculative twist—East Rand Extensions. Both appear to be good value at current levels.

MURCHISON CUTS ITS COSTS

Antimony is a metal that has a wide variety of uses. The demand for it can thus fluctuate quite substantially as Consolidated Murchison, the big South African producer, has learnt to its cost over the past few years. In 1958 there was a further recovery in demand and the company was able to increase its exports considerably. The benefit to

revenue, however, was almost totally carved away by the drop in the U.K. price for 99.6 per cent regulus metal from £222 10s. to £197 10s. that took place on November 1, 1957. Consequently, Murchison's revenue last year was only £12,265 higher at £741,315. The profit after tax, however, was up by £99,644 at £343,438, a reflection of a saving in working costs of no less than £156,286.

This was brought about by a suspension of certain mining operations that were not immediately essential and which were detailed by the chairman, Mr. S. G. Menell, last year. As usual, a fairly full distribution of earnings has been made. The final dividend of 5s. 3d. per 5s. share announced last December brought the 1958 total up to 8s. against 5s. 6d. for 1957 and this payment absorbs £332,800 leaving the carry forward some £6,000 up at £524,406. The balance sheet shows a healthy position with net liquid assets totalling £524,406 against the modest capital of £208,000.

What of 1959? A fair enough start has been made, the March quarter profit having been £105,794 from antimony and gold against only £27,459 in the first quarter of 1958. The chairman also says that, although current production of concentrates and cobbled ore from the Gravelotte section of the mine is sufficient to meet present and projected sales, it is intended that output should be augmented later this year by ore from the United Jack section where stoping is to be resumed and an exploratory development programme initiated. At their current price of 46s. 3d. Murchison return over 20 per cent after allowing double tax relief.

BETTER R.S.T. AND MUFULIRA PAYMENTS

The last few weeks have done a lot to remove from copper shareholders' faces the worried expression which has been their distinguishing mark since the metal bottomed at £184 just over a year ago.

Following the publication of the good R.S.T. group quarterlies and the continued, if slow, recovery in the metal price, R.S.T. and Mufulira have both declared interim dividends which, though still low, are a great deal more respectable than those paid a year ago. The R.S.T. distribution is of 4d. per share (2½d. net of Rhodesian tax) compared with 1d., and Mufulira's is of 1s. 9d. (1s. 1½d. net) compared with 8d. The respective totals for 1957-8 were 7d. and 3s. 3d.

RIX-ATHABASCA'S NEW EXPLORATION PROGRAMME

Forseeing a possible end in the reserves of the Smitty workings some time this summer, Rix-Athabasca has inaugurated an exploration programme to seek a replacement.

The programme includes further diamond drilling in the lower levels of the Smitty shaft, surface mapping and drilling in the area reachable from the Smitty and Leonard workings, as well as investigations of favourable geological structure elsewhere on the property. The latter approach may involve sinking a new shaft serviceable from the existing plant facilities and is looked to with some optimism. The surface exploration will be a continuing programme throughout this year and next.

Quite apart from the above, the Leonard shaft will continue to produce ore against its contract with Eldorado Mining and Refining Ltd., with shipments scheduled at 100 tons per day. This has been a two-level operation to date, but shaft sinking is almost completed and provides for a 3rd, 4th and 5th level. The ore from the 1st and 2nd levels has been, for the most part, high in carbonate and not suitable to the acid circuit at Lorado. It is hoped that somewhat lower carbonate conditions may be experienced as the formation is explored downwards. Production has been maintained at the Leonard Mine during shaft sinking operations.

FINANCIAL NEWS AND RESULTS IN BRIEF

Aluminium Limited's Earnings.—Net income of Aluminium Ltd. for the three months ended March 31 last was \$2,310,000—8 c. per share—compared with \$5,331,000, or 18 c. per share, in the corresponding period of 1958. Total sales of aluminium in the March, 1959, quarter were 124,000 tons, 4,000 tons lower than in the same period last year.

Nigel Return Approved.—At the annual meeting of Nigel Gold Mining held on May 12, a special resolution was passed giving approval to a reduction of capital by 1s. 6d. per share. Court confirmation is now awaited.

Ex-Lands Profits Slump.—Profit before tax of Ex-Lands Nigeria fell from £81,352 in 1957 to £35,119 last year. An unchanged dividend of 15 per cent is, nevertheless, recommended. Meeting, June 25 (provisionally).

Capital Return from Geevor.—Geevor Tin, one of Cornwall's two surviving tin producers, is to make a capital repayment of 4s. 6d. per 5s. stock unit. By means of a nine-for-one scrip issue, it is

proposed to restore the issued capital to the pre-repayment level after the return has been made. The plan is subject to approval at an extraordinary meeting to be held on June 12.

Scrip Issue by Sungei Besi.—In order to bring the issued capital more into line with the assets actually employed, Sungei Besi is proposing a 2-for-1 scrip issue. An extraordinary meeting will be held on June 11 to consider the necessary resolutions.

Bisichi Pays More.—Bisichi Tin is recommending a final dividend of 4½d. per share in respect of 1958. This compares with 3d. per share for 1957. Profit for the year before tax rose to 80,639 from £76,999. Meeting, June 25 (provisionally).

Inco's Profits Are Improving.—At \$16,984,000 (\$1.16 per share), net earnings of the International Nickel Co. in the first quarter of 1959 showed a strong recovery from the strike-hit three months to December, 1958. Compared with the first quarter of 1958, earnings were \$4,771,000 higher.

DE BEERS CONSOLIDATED MINES LIMITED

(Incorporated in the Union of South Africa)

PROSPECTS OF HIGHER DIAMOND SALES THIS YEAR

Group's Non-Diamond Assets Exceed £100 Million

The following are extracts from the statement by the chairman, **Mr. H. F. Oppenheimer**, which has been circulated with the report and accounts for 1958.

The sales effected by the Central Selling Organization in 1958 amounted to £65,543,387, of which £49,420,696 were gems and £16,122,691 were industrials. This compares with a total of £76,772,112 for 1957, divided as to £52,818,096 of gems and £23,954,016 of industrials. This shows that there was a very substantial falling off in sales and it is therefore very satisfactory that our company was able to maintain its dividend and further strengthen its overall position.

At December 31, the net cash assets of the Group totalled £35,884,735, which is only £571,404 less than at the end of the previous year.

While the policy of investing considerable sums outside the diamond industry was continued during the year, there was also a very substantial appreciation in the market value of the investments already made. The Group's non-diamond investments valued at market price in the case of quoted investments and book value in the case of unquoted investments amounted to £64,551,421, an increase of £12,205,595 over the previous year. The total of the Group's non-diamond investments and of its net cash assets amounted to £100,436,156.

Williamson Mine

The most important development in our business during 1958 was our purchase jointly with the Government of Tanganyika of the entire share capital of Williamson Diamonds, Limited. The Williamson Mine is an important one, and may be expected to produce about £3,000,000 to £3,500,000 of diamonds per annum.

The arrangements concluded in regard to Williamson Diamonds represent an important strengthening of the structure of the trade. We particularly welcome our partnership with the Tanganyika Government and are convinced that it is in the interests both of the territory and of the diamond trade as a whole.

I referred last year to the large uncontrolled production by African diamond diggers in Sierra Leone. The large purchases made by The Diamond Corporation Sierra Leone, Limited, had the effect of keeping the market price of these diamonds steady in spite of the serious recession of the trade in the first half of the year. Our agreement with the Sierra Leone Government proved itself in this way of great benefit to the territory, and at the same time was an important factor in maintaining the stability of the industry as a whole.

We have, however, long felt that it was desirable to put the arrangements for the marketing of this production on a more permanent and stable basis, and one which would be fully acceptable to the individual African diggers. We therefore initiated negotiations with the Government which are still proceeding.

It is proposed to set up a Government Diamond Office through which the whole

of this African production will be marketed.

Synthetic Diamonds

Last year I mentioned that our diamond research laboratory was embarking on large-scale tests of natural and synthetic diamond grit in various diamond grinding operations. These tests have shown that natural diamond grit is greatly superior to the synthetic product in metallic bonded grinding wheels, and also in the cutting discs which are now being used in the large concrete road and airfield programmes in the United States. It is claimed that synthetic grits are more effective than natural diamonds in resinoid-bonded wheels. There must, however, be doubt about the significance of such claims on account of widely differing results obtained under varying conditions.

ORANGE FREE STATE INVESTMENT TRUST LIMITED

(Incorporated in the Union of South Africa)

SUBSTANTIAL RISE IN PROFITS

UPWARD TREND IN DIVIDEND INCOME CONTINUES

The following are extracts from the Statement by the Chairman which has been circulated with the annual report and accounts for 1958:

With the expansion of mining operations in the Orange Free State, the output of this goldfield rose during 1958 to the equivalent of about one-quarter of the gold production of the Union of South Africa. A total of 10,527,000 tons of ore was milled to yield 4,329,411 fine ounces of gold worth £54,199,536—an increase of 759,000 in tons milled and of 599,759 in fine ounces recovered when compared with 1957. The production of uranium oxide was 2,291,811lb.—a small increase over the previous year's figure.

The company's income from investments increased by about one-third from £1,722,042 in 1957 to £2,382,527. Profits on realization of investments—including the sale of certain shares to the American-South African Investment Company—were exceptionally high and amounted to £502,385. Interest paid was £121,760 less than in the previous year. The profit for the year amounted to £2,685,760 compared with £1,397,089 in 1957. Dividends of 4s. per share, absorbing £2,141,806, were paid, and an amount of £500,000, approximately equal to the exceptional profit made during the year on the sale of shares, was transferred to general reserve.

The company participated with the Anglo American Corporation and other mining finance houses in the sale of a large parcel of gold mining shares to American-South African Investment Company. The latter company, which is quoted on the New York Stock Exchange, was formed last year to provide a vehicle for the investment of American capital in South African mining and industrial companies. The sale of these shares was particularly advantageous as the profit was free of taxation, and, in

We will shortly be in a position to market a new diamond grit specially prepared for resinoid-bonded wheels.

At the present time, the demand for diamonds, both gem and industrial, is at a satisfactory level. In the industrial field, however, this is due to a considerable extent to the effect of Government stockpiling. The production of industrial diamonds is, generally speaking, in excess of what is required for current consumption.

One of our associated companies has recently formed a small company in Canada jointly with Engelhard Industries Limited with the object of expanding the use of crushing board, especially in the field of glass grinding. Our laboratories are also busy on a number of projects designed to increase the demand for other types of industrial stones. We are hopeful that from all this work significant results will be achieved.

The United States continues to consume the greater part of all diamonds which we sell, but there has been a tendency lately for the proportion consumed in other countries to increase. Taking all facts into consideration, it appears probable that sales in 1959 will be substantially higher than in 1958, and that our company will have a prosperous year.

addition, this transaction and the other sales of shares during the year have helped to strengthen the liquid position of the company.

Investments

During 1958, the company increased its holding in Free State Geduld, President Brand, President Steyn and Free State Saaiplaas, by subscribing for rights offered by these companies to shareholders. The company also acquired a participation in the prospecting of certain farms in the central, eastern and northern areas of the Orange Free State, and, since the end of the year, has subscribed for the new shares offered by Loraine.

There was a substantial increase in the market value of the company's quoted investments from £33,919,135 on December 31, 1957, to £46,563,844 at the close of the financial year; the book cost of quoted investments increased by £884,512 during the same period. At March 31, 1959, the market value had increased to £57,995,964.

Important changes took place during the year in the company's capital and loan structure as a result of the exercise of conversion and subscription rights attaching to the four-and-a-half per cent. registered bonds and five per cent. registered notes. The effect has been an increase of £3,679,238 in the issued share capital and share premium, and a decrease of £1,764,011 in the fixed loan indebtedness—a net increase of £1,915,227 in the capital and loan funds raised by the company. New capital arising from the exercise of these rights contributed to the marked improvement in the cash position of the company and an excess of short term liabilities over cash assets of £1,941,282 at the end of 1957 was reduced to £276,735 a year later. Since the end of the year the

company's cash position has been strengthened even further by the receipt of £2,500,000, following the exercise of the right held by Anglo American Corporation and De Beers Investment Trust to subscribe for 625,000 shares at 80s. each. The issued capital now stands at £5,471,703 in 10,943,406 shares of 10s. each, and there are no rights outstanding against the 3,056,594 reserve shares.

The overall effect of the exercise of the various rights has been the accrual of an amount in excess of £4,400,000 of new capital, and the company has large liquid reserves to follow its investments and to take advantage of any opportunities for new business that may arise.

Mining Operations

The scale of mining operations in the Orange Free State goldfield will continue to increase as new shafts reach the production stage. Since the end of 1957, six new shafts have been commissioned, and the benefits of their initial production will be felt only during the current year. A further nine shafts are in various stages of progress, and it is estimated that they will all be commissioned before the end of 1961.

The progressive commissioning of new shafts accompanied by additions to plant capacity will result in a steady and material increase in the output of gold. It is, therefore, reasonable to expect that the upward trend in the company's dividend income will continue. Increased dividends, respectively 1s. 6d. and 6d. higher than those in March, 1958, have, in fact, been declared recently by Free State Geduld and Western Holdings.

In June, 1958, the boards of President Brand and President Steyn announced plans to sink separate twin shaft systems on their respective properties in place of the joint shaft system that was to have been sunk on their common boundary. The importance of the development lies in the considerably higher milling rate that each mine will be able to achieve at an earlier stage.

Towards the end of 1958, Loraine Gold Mines, Limited, merged with Riebeeck Gold Mining Company, Limited. Riebeeck will benefit from the merger by reaching production at an earlier stage, and at lower capital cost, and Loraine's advantage lies in the large stake it has acquired in the combined property.

In January, 1959, very high values were encountered in development south-west of Free State Geduld No. 1 Shaft. An aggregate of 215 feet, exposed in the haulage and companion return airway on 45 Level, was sampled averaging 9.772 inch-dwt. Viewing these results in conjunction with the values previously disclosed in underground boreholes, it seems probable that a substantial zone of enrichment exists south-west of No. 1 Shaft. It has accordingly been decided to site a new circular shaft approximately 4,000 feet due south of No. 1 Shaft and to start sinking operations as soon as possible. In addition, surface boreholes will be sunk to explore and determine the extent of the mineralized area beyond the western boundary which may be included in the company's lease area without alteration to its lease formula. The cost of this programme will be financed by the mining company out of its own resources.

Copies of the annual report and accounts may be obtained from the London Office of the Company, 40 Holborn Viaduct, E.C.1.

ST. HELENA GOLD MINES, LIMITED

Mr. C. B. Anderson, the Chairman of the Company, in addressing members at the Annual General Meeting held at Johannesburg on May 16, 1959, said that in 1958 the tonnage milled increased by 76,000 tons to 1,468,000 tons, and the yield was slightly higher at 5.85 dwt. per ton so that, although the average price received for gold was 5d. per ounce fine lower than in 1957, the working revenue at £5,384,261 was £281,983 higher. Working costs absorbed £3,073,609 and the working profit for the year was £2,310,652.

The net profit for the year was £2,274,536. Capital expenditure, largely in connection with No. 2 Shaft, the additions to and expansion of the reduction plant, and initial work on the new No. 7 Shaft, amounted to £1,256,309; £20,000 was transferred to Loan Redemption Reserve and two dividends, totalling 2s. 1d. per share, or 6d. more than in 1957, were declared, absorbing £1,002,604. The unappropriated balance carried forward was £831,222.

Development and Ore Reserve

The total development footage driven during the year at 73,460 feet was 25,485 feet greater than in 1957, this increase being due in the main to the commencement of development in the No. 2 Shaft area. Of the 23,230 feet on Basal Reef and sampled, 49 per cent. proved payable averaging 519 inch-dwt. There was a slight reduction in percentage payable compared with the previous year, but the average inch-dwt. figure rose considerably. Some of the increase was due to good values around No. 2 Shaft and some to better values disclosed by development from No. 4 Shaft.

The ore reserve at December 31 last was estimated to amount to 3,400,000 tons, an increase of 150,000 tons over the comparative figure for the end of 1957. The average value rose by 0.4 dwt. to 6.5 dwt. while the estimated stoping width at 55 inches was 1 inch less.

Expansion Programme

Very good progress had been made with development from No. 2 Shaft down to 19 Level but the very complex faulting exposed had retarded the stoping programme somewhat. It had therefore been decided to make preparations to develop down to 24 level in order to improve the position. In the meantime the expansion of stoping operations at this shaft might be slower than was originally expected. Despite these delays, production and profits both increased during 1958 as compared with the previous year.

No. 7 Shaft

It was mentioned last year that consideration was being given to the exploitation of the eastern side of the property where drilling had shown the existence of an upthrown block of reef-bearing ground, between the fault and the President Brand boundary. During the year, it was announced that the northern part of this upthrown strip could best be mined from No. 2 Shaft. In order to provide the necessary ventilation, however, a 22 ft. diameter, circular, un-equipped shaft, to be known as No. 7 Shaft, would be required. The new shaft, sited approximately 5,200 feet east-south-east from No. 2 Shaft, would be sunk to a depth of 4,100 feet to meet the crosscut being driven on 18 level from No. 2 Shaft. Depending on cir-

cumstances, this shaft might be continued to its ultimate depth of approximately 6,000 feet or might be deepened at a later date. This deepening would eventually assist in the ventilation of the lower levels of the mine served from No. 2 Shaft.

At the year end the shaft had reached a depth of 40 feet and the collar, hoist foundations and temporary headgear had been completed. At the end of April it had reached a depth of 147 feet and the crosscut on 18 level was 1,785 feet from the shaft position. Two cementation boreholes were being drilled at the shaft site, and cementation, which proved so successful at No. 2 Shaft, was in progress.

There were hopes that the grade of ore in the upthrown strip would be higher than that of the rest of the mine but it would naturally be some time before ore from the area could make any significant contribution to the tonnage milled.

The estimated cost of No. 7 Shaft and the connecting crosscut from No. 2 Shaft was £1,690,000. Capital expenditure during the current year, which would be found from profits, would be of the order of £1,200,000, of which £800,000 would be in respect of the new shaft.

Pneumoconiosis Charges

Due largely to a decrease in the number of new certifications the annual levy payable by Group A Controlled Mines was somewhat reduced in respect of the year ended March 31, 1959, and amounted to £2,467,500. The effect of this reduction was a saving to the Company of £14,406, equivalent to 2d. per ton milled. The levy had since been further reduced for the same reason and, subject to re-assessment during the year, would amount in all to £800,000 for the year ended March 31, 1960.

Results in the First Quarter of 1959

During the first quarter of 1959 the ore milled totalled 415,000 tons and the working profit was £647,180. Capital expenditure amounted to £386,705. During the first four months of this year the development footage driven totalled 26,433 feet of which 6,975 feet was on Basal Reef and sampled disclosing 4.110 feet or 59 per cent. payable, averaging 30.9 dwt. over 20 inches equivalent to 617 inch-dwt.

A dividend of 1s. 3d. was declared in March of this year, being 3d. more than the corresponding dividend last year.

In reply to questions in regard to the area surrounding No. 2 shaft, the Chairman stated that for reasons he had given previously to members it was not proposed to publish the development results obtained in the area separately. However, some 12,000 feet of reef development had been sampled in this area since the start of operations at approximately 650 inch-dwt. About half the current development work on the mine was now being carried out in this area.

The Chairman further stated that the crosscut from No. 2 shaft should reach the position of No. 7 shaft in about five months time if all went well. No. 7 shaft, however, would not be completed until a somewhat later date.

The Report and Accounts were adopted. The retiring Directors, Messrs. C. B. Anderson, H. F. Oppenheimer and M. W. Richards, were re-elected.

WINKELHAAK MINES, LIMITED

Mr. T. P. Stratten, the Chairman of the Company, in addressing members at the Annual General Meeting held at Johannesburg on May 15, 1959, said that during the period of trial milling, from March to November, 1958, a considerable portion of the ore treated was from development faces and surface dumps and consequently was below the average grade of the mine. Revenue from gold won during trial milling was £525,338.

Almost exactly three years from the formation of the Company and the start of work on the property, the mine made its maiden declaration, in respect of December, 1958. The tonnage milled was 69,000 tons at an average yield of 4.49 dwt. per ton. The revenue was £194,352 and working costs were £178,850, giving a working profit for that month of £15,502. Since then the monthly working results had shown a steady improvement. In the first four months of this year the tonnage of ore milled was 280,000 tons giving an average yield of 4.75 dwt. per ton and a total working profit of £95,915.

Development and Ore Reserve

The total development footage accomplished during 1958 at 53,557 feet was nearly double the 1957 figure. Of this, 21,045 feet was on Kimberley Reef and sampled, disclosing 13,990 feet, or 66 per cent., to be payable with an average value of 9.6 dwt. over 39 inches, equivalent to 373 inch-dwt. The ore reserve, calculated as at December 31 last, amounted to 1,200,000 tons having an average value of 5.7 dwt. over an estimated stoping width of 58 inches. During the first four months of the current year development footage on Kimberley Reef totalled 18,808 feet of which 6,990 feet was on reef and sampled, disclosing 5,235 feet, or 75 per cent. payable, averaging 12.3 dwt. over 34 inches equivalent to 419 inch-dwt. Since the year end the workings from No. 1 Shaft had been connected with those from No. 3 Shaft on 5 level which assisted underground operations in various ways.

Expansion of Operations

No. 3B Shaft was completed and brought into operation in October 1958 and so far ore had been hoisted at the rate of about 70,000 mill tons per month. The Consulting Engineers were satisfied that the shaft system was capable of handling up to 90,000 mill tons per month and they had therefore recommended that an extra tube mill be installed to enable this tonnage to be milled with high metallurgical efficiency. It was expected that the new mill would be in operation about the middle of 1960.

The financial arrangements for the Company provided funds amounting to approximately £8,500,000 in all, which it had been estimated would be sufficient to take the mine to production at 60,000 tons per month. Included in these were temporary loan facilities from Union Corporation, Limited of up to £750,000 of which £650,860 had been drawn at the end of April last. The capital funds required for the expansion of production to 90,000 tons per month were estimated to amount to approximately £300,000 spread over the next year or so and would be found partly from the Company's own resources and partly from further drawings on the temporary loan

facilities. Apart from the reduction plant extensions the Company had no major items of capital expenditure immediately ahead of it. The development of the deeper levels of the mine, however, would necessitate additional shaft capacity at a later date.

Mining Lease

The mining lease which the Government agreed to grant to Capital Mining Areas had now been signed and ceded to the Company. The mining lease provided inter alia, that the Company might apply for the inclusion of the undermining rights of an area to the south of and contiguous with the lease area, provided that such addition did not exceed five per cent. of the present lease area, without affecting the lease formula.

As underground development work on the Company's property and surface drilling indicated that the sub-outcrop of the Kimberley Reef lay to the south of part of the present southern boundary of the Company's lease area, it became evident that some adjustment to the lease area would be necessary. With a view to determining what ground should be included in such adjustment the Company entered into a prospecting contract with Capital Mining Areas, Limited, carrying the option to purchase at £25 per morgen the mineral rights of all or part of a portion of the farm Winkelhaak 135 adjoining the south-western boundary of the lease area. The Company then drilled two boreholes on the area under option, the results of which were given in the quarterly report for December 1958. In the light of these results this option had now been exercised in respect of approximately 180 morgen of the area covered by the prospecting contract and in parallel had also

purchased the surface of the entire area from Capland Estates, Limited, at a price of £60 per morgen.

Application would shortly be made to the Mining Leases Board for the inclusion in the lease of the mineralized portion of the area purchased from Capital Mining Areas in terms of the option and of the mineral rights of part of the farm Kafferskraal No. 289 which were already held by the company.

Housing

The township of Evander laid out by the Company's wholly-owned subsidiary, Evander Township, Limited, had not yet been proclaimed, but as a portion of the ground on which the township was situated had now been proclaimed under the Transvaal Precious and Base Metals Act of 1908, as amended, that Company had applied for a reservation for township purposes in terms of that Act. To date the Company has built 298 houses in the township, and the school had been completed and was now in use.

Pneumoconiosis Charges

Due largely to a decrease in the number of new certifications the annual levy payable by Group A Controlled Mines had been reduced from the amount of £2,467,500 paid in respect of the year ended March 31, 1959, to a net amount of £800,000 for the current year.

In reply to a member who enquired when it was expected that the Company would commence the payment of dividends, the Chairman stated that it was impossible to estimate this as it depended on the results achieved in the mine and the amount of capital expenditure incurred.

The Report and Accounts were adopted. The retiring Directors, Messrs. I. T. Greig, T. Reekie and M. W. Richards were re-elected.

RAND, KLERKSDORP AND O.F.S. GOLD AND URANIUM PRODUCERS

Comparison and analysis of results for the first three months of 1959 and 1958

Heading		Jan. to Mar.	Rand Cos.	Klerksdorp Cos.	O.F.S. Cos.	Total
Tons milled :	Millions	1959	12.1	1.7	2.9	16.7
		1958	11.9	1.5	2.4	15.8
Ounces produced :	Millions	1959	2.6	0.7	1.2	4.5
		1958	2.5	0.6	1.0	4.1
Grade per ton :	Dwt.	1959	4.4	8.1	8.4	5.4
		1958	4.2	7.8	8.2	5.2
Working costs per ton : s. d.		1959	40/2	56/11	60/6	45/4
		1958	42/11	53/7	59/11	46/6
Working profits :	Gold £m.	1959	8.7	3.7	6.4	18.8
		1958	6.0	3.3	5.1	14.4
Working profits :	Uranium and Acid £m.	1959	2.5	2.8	1.8	7.1
		1958	4.6	2.7	1.5	8.8
Total	£m.	1959	11.2	6.5	8.2	25.9
		1958	10.6	6.0	6.6	23.2
Dividends declared :	£m.	1959	—	—	7.5	7.5
		1958	—	—	6.1	6.1
Non-Europeans at end March :		1959	258,000	50,000	72,000	380,000
		1958	238,000	37,000	59,000	334,000
Number of Cos. included		1959	38	7	10	55
		1958	37	7	10	54

Footnote :

When comparing the Working costs and Working profit figures, it should be noted that from 1/1/1959 Uranium mining and milling costs are no longer included under the heading "Working costs" but are charged against Uranium revenue.

British Banking in Asia



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I.M.E Symposium in July

Introductory notes concerning the Symposium on Shaft Sinking and Tunnelling, arranged by The Institution of Mining Engineers, appeared in our issue of December 12, 1958.

The Symposium, to be held in the Apex conference room, Olympia, on July 15, 16, 17, will be opened by Sir James Bowman, chairman of the National Coal Board. Ladies accompanying members are invited to attend the reception to be given by the Ministry of Power during the evening of July 15, and to take part in visits arranged by The Southern Counties Institute of Mining Engineers. The Council of Underground Machinery Manufacturers has arranged a luncheon for Symposium members on Wednesday, July 15.

The final programme of the Symposium is now to hand. Papers to be presented, in addition to those listed in our previous issue, will include:

From Belgium: (20) Construction by freezing of a new 50-metre length of tubing while maintaining normal winding of 3,000 tons per day, by J. Venter, director, Inichar, Liège; (21) Shaft sinking after drilling an axial hole and walling with liners suspended without provisional support, presented by P. Stassen, director of research, Inichar, Liège, and H. van Duyse, mining engineer, Inichar, Liège; (22) Large-section tunnelling in soft ground with lining of concrete blocks, by P. Stassen and H. van Duyse.

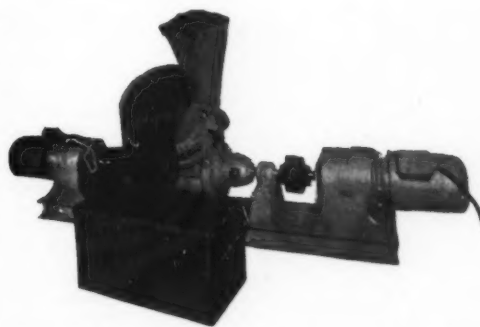
From Czechoslovakia: (25) Some problems on the use of guide ropes in modern mechanized shaft-sinking methods, by Z. Seif.

From Hungary: (23) Experiences in Hungary with cementation in shafts and tunnels using bentonite, by A. Fitzek, civil engineer, Shaft Sinking Trust, Budapest, and L. Sarosi, civil engineer, Polytechnical University, Budapest.

From Poland: (24) An example of overcoming shaft-sinking difficulties in Poland, by B. Sztukowski, technical director of the enterprise for shaft construction, Bytom, and Fr. Misong.

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THE CENTRAL MINING — RAND MINES GROUP

Extracts from Chairmen's Statements circulated to Shareholders

(After the Annual General Meetings have been held, reports of the proceedings will be made available on request to the London Secretaries—A. Moir & Co., Ltd., 4 London Wall Buildings, London, E.C.2.)

CITY DEEP, LIMITED

(Incorporated in the Union of South Africa)

The Fifty-eighth Ordinary General Meeting of shareholders will be held in Johannesburg on May 25, 1959. The following is an extract from the circulated statement by the Chairman, Mr. P. H. Anderson, dated May 15, 1959.

WORKING RESULTS

During 1958, 1,511,000 tons of ore were milled at an average yield of 3.972 dwt. per ton, resulting in a recovery of 300,102 ounces of fine gold. The relative figures for the previous year were 1,780,000 tons milled with an average yield of 3.909 dwt. and a recovery of 347,907 ounces.

Working costs for 1958 were £551,291 lower than the previous year, but working revenue decreased by £608,588, resulting in a net decrease in working profit of £57,297 to £139,189.

These comparisons must be viewed in the light of the reorganization of the mine and the reduction in the scale of operations which became effective in June, 1958. In this process the major portion of the Nourse Section of the mine was closed down, and thus the milling rate was reduced from 148,000 tons per month in May to 113,000 tons per month at the end of the year.

As a result of these changes the mine is now on a sounder basis of more concentrated work, and accordingly it has been decided to attempt to increase still further the rate of shaft sinking, which has as its objective an improvement in the ore reserve position.

ACCOUNTS

To the working profit was added a credit adjustment of £19,589 in respect of pneumoconiosis, interest received amounting to £29,852 and £4,631 being the difference between sundry items detailed in the Income and Expenditure Account, making a total profit for the year, before taxation, of £193,261. This, together with the unappropriated balance of £780,456 brought forward from the previous year, gave a total of £973,717, which was dealt with as follows:

Dividends Nos. 74 and 75 of 6d. and 7½d. per share respectively totalled	£114,009
Provision for taxation amounted to	6,408
Transfer to Capital Reserve in respect of net expenditure on mining assets less realization of trade investments, absorbed	14,170
making a total of	£134,587
and leaving an unappropriated balance to be carried forward to the current year's accounts of	839,130
	£973,717

The unappropriated balance, together with Retiring Gratuities and Abnormal Costs Reserves, was represented by net current assets totalling £1,033,217, as detailed in the Balance Sheet.

PNEUMOCONIOSIS

The annual levy paid during the year ended March 31, 1959, by Group A controlled mines amounted to £2,467,500. The levy for the current year has been fixed by the Pneumoconiosis Board at a net amount of £800,000. This substantial reduction in the levy is due in the main to a decrease in the number of new cases of pneumoconiosis and tuberculosis amongst mine employees. Moreover, it is expected that this liability will be reduced further because of a surplus existing in the Controlled Mines' Compensation Fund, as disclosed in a recent valuation of the Fund carried out in terms of the Pneumoconiosis Act.

OPERATIONS AT THE MINE

In the area below K1 Incline Shaft and south of the Vierfontein dyke where the Main Reef Leader was intersected towards the end of 1958, disclosures on this reef at the end of April totalled 830 feet of an average value of 18 dwt. over 22 inches, equal to 397 inch-dwt. Sinking operations have been resumed in both K1 and K2 Incline Shafts which are now being advanced through the dyke.

CROWN MINES, LIMITED

(Incorporated in the Union of South Africa)

The Sixty-third Ordinary General Meeting of shareholders will be held in Johannesburg on May 26, 1959. The following is an extract from the circulated statement by the Chairman, Mr. P. H. Anderson, dated May 19, 1959.

WORKING RESULTS

While the total tonnage milled decreased by 85,000 tons to 2,751,000 tons for the year, due mainly to the steadily declining sources of ore, the gold yield improved by 0.115 dwt. to 3.056 dwt. per ton milled. A reduction in the average stoping width of 0.6 inch which was achieved during 1958 was a contributory factor in obtaining a higher yield per ton. The improvement in yield represents approximately 1s. 5d. improvement in the revenue per ton, and although working costs increased by 5d. per ton milled, the working profit rose by £125,482 to £198,158.

PNEUMOCONIOSIS

The annual levy paid during the year ended March 31, 1959, by Group A controlled mines amounted to £2,467,500. The levy payable for the current year has been fixed by the Pneumoconiosis Board at a net amount of £800,000. This substantial reduction in the levy is due in the main to a decrease in the number of new cases of pneumoconiosis and tuberculosis amongst mine employees. Moreover, it is expected that this liability

will be reduced further because of a surplus existing in the Controlled Mines' Compensation Fund as disclosed in a recent valuation of the Fund carried out in terms of the Pneumoconiosis Act.

DEVELOPMENT AND ORE RESERVE

Due to the limited area remaining available for development, the development footage decreased in comparison with the figures for the previous year.

The payable ore developed during the year amounted to 530,400 tons of an average value of 4.4 dwt. Compared with the payable ore developed in 1957, these figures reflect a decrease of 287,600 tons and an increase of 0.5 dwt. in the value. Allowing for a transfer of 343,000 tons from shaft and safety pillars, the available ore reserve decreased from 4,365,000 tons of an average value of 4.7 dwt. over a stoping width of 44.5 inches to 3,612,000 tons of an average value of 5 dwt. over a stoping width of 44 inches.

CURRENT OPERATIONS

Mining operations continue to be confined mainly to the lower western portion of the mine supplemented by reclamation operations in the upper levels of the mine and shaft pillar extraction. The stoping of No. 14 Shaft Pillar has continued satisfactorily and the stoping of the No. 16 Shaft Pillar has begun. The preparation of No. 12 Shaft Pillar for extraction is continuing.

Two exploratory drives, one on Main Reef Leader and one on the Main Reef horizon, are being carried on in an easterly direction on the 62nd level together with accessory reef winzes in the south-western area of the mine. This work, together with the resumption of the sinking of S.5 Incline Shaft, represents an entry into the zone to the south of the Vierfontein Dyke.

DURBAN ROODEPOORT DEEP, LIMITED

(Incorporated in the Union of South Africa)

The Sixty-second Ordinary General Meeting of shareholders will be held in Johannesburg on May 25, 1959. The following is an extract from the circulated statement by the Chairman, Mr. T. Reekie, dated May 15, 1959.

WORKING RESULTS

The tonnage milled increased slightly from 2,192,000 tons to 2,200,000 tons and the yield improved from 3.533 to 3.621 dwt. per ton milled, resulting in an additional 11,134 ounces of gold being recovered. The average price of gold of 250s. 4d. per ounce fine received by the Company was, however, less by 5d. per ounce than that for the previous year. Working revenue increased by £126,731 to £4,998,242, but working expenditure at £4,359,954 was £129,263 higher, and the working profit for the year was accordingly lower by £2,532 at £638,288.

ACCOUNTS

To the working profit of £638,288 was added £36,497 in respect of interest, £13,709 in respect of the Company's share of the surplus of the Outstanding Liabilities Trust Fund as at March 31, 1958, and £7,653 being the difference between sundry items detailed in the Income and Expenditure Account, to give a profit before taxation of £696,147. Taxation absorbed £119,287, leaving £576,860 to be added to the balance of the Income and Expenditure Account at December 31, 1957, making a total of £1,493,859. Of this amount £348,750 was appropriated for two dividends of 1s. 6d. each per share, and £159,250 was transferred to Capital Reserve in respect of net expenditure on Mining Assets and Trade Investments, leaving a balance in the Income and Expenditure Account at December 31, 1958, of £985,859 to be carried forward to the current year. This balance, together with Reserves for Retiring Gratuities and Abnormal Costs, totalled £1,120,389, which was represented by net current assets as detailed in the Balance Sheet.

PNEUMOCONIOSIS

The annual levy paid during the year ended March 31, 1959, by Group A controlled mines amounted to £2,467,500. The levy for the current year has been fixed by the Pneumoconiosis Board at a net amount of £800,000. This substantial reduction in the levy is due in the main to a decrease in the number of new cases of pneumoconiosis and tuberculosis amongst mine employees. Moreover, it is expected that this liability will be reduced further because of a surplus existing in the Controlled Mines' Compensation Fund, as disclosed in a recent valuation of the Fund carried out in terms of the Pneumoconiosis Act.

DEVELOPMENT

The Main Reef is now almost fully developed to the 40th level and development is proceeding along the 40th, 42nd and 44th levels. In the Lease Area 6,832 feet were developed during 1958 of which 3,472 feet were on Main Reef, 1,200 feet were on Kimberley Reef on the 17th level, and 2,160 feet were off reef. On Main Reef 1,180 feet or 36.9 per cent were payable with an average value of 384 inch-dwt., while on Kimberley Reef 510 feet or 46.8 per cent were payable at 162 inch-dwt. Of the total of 11,770 feet developed since commencement of operations in the Lease Area to date, 7,720 feet have been sampled, of which 38.1 per cent or 2,940 feet were payable with an average value of 362 inch-dwt.

ORE RESERVE

The available ore reserve re-estimated at December 31, 1958, totalled 7,331,000 tons, a decrease of 429,000 tons compared with the calculation at the previous year-end. The tonnage available on Kimberley Reef increased from 2,553,000 tons to 3,223,000 tons, but there was a decline of over a million tons in the reserve available on Main Reef from 4,840,000 tons to 3,817,000 tons, due to a decrease in block widths, to the limited number of development ends available at present, to the further extension of the longwall system of stoping at depth, and to losses resulting from an increased pay limit. The value of the available reserve was 0.1 dwt. higher at 4.1 dwt., and the estimated stoping width was 2.5 inches less at 57.2 inches.

SHAFT SINKING

The deepening of No. 5A Sub-Vertical Shaft was resumed in March, 1958, but

was temporarily suspended the following month due to broken ground requiring immediate lining. Sinking subsequently recommenced, and at the end of April, 1959, this Shaft had reached a depth of 4,081 feet below the collar or 132 feet below 51 Station. Its final depth will be approximately 4,350 feet below the collar, i.e. 207 feet below the horizon of the 52nd level.

It was decided towards the close of the year to sink a small sub-vertical shaft (No. 1E Sub-Vertical) in the lower eastern portion of the mine from the 40th level to the 52nd level, to enable the Main Reef in this area to be further developed and, later, to service this portion of the mine. The Main Reef dips very steeply in this area and the provision of this additional shaft, approximately 2,100 feet in depth, will assist considerably towards the opening up of this section.

EAST RAND PROPRIETARY MINES, LIMITED

(Incorporated in
the Union of South Africa)

The Sixty-third Ordinary General Meeting of shareholders will be held in Johannesburg on May 26, 1959. The following is an extract from the circulated statement by the Chairman, Mr. P. H. Anderson, dated May 19, 1959.

WORKING RESULTS

The development footage for the year under review totalled 45,052 feet, of which 7,240 feet were sampled. The percentage payability at 36.2 per cent was lower by 16.1 per cent compared with the figure for the previous year, due mainly to a proportionately larger footage being sampled on the Main and South Reefs in the Western Section of the mine where values are lower than on the Composite Reef in the Central Section. The 2,620 feet of payable development gave an average channel value of 13.1 dwt. over a channel width of 34 inches, equivalent to 444 inch-dwt., which was a slight improvement on the previous year. The "H" pilot winze has reached a depth of 11,003 feet below surface, which mining depth constitutes a world record.

The ore milled during the year amounted to 2,669,000 tons, with an average yield of 5.064 dwt. per ton, giving a gold recovery of 675,783 ounces fine. The net amount per ounce fine received for the gold was £12 10s. 4d., giving a working revenue in respect of gold of £8,458,116. A relatively small amount of revenue amounting to £21,065 was received in respect of silver and osmiridium produced, giving a total working revenue of £8,479,181. Working expenditure, which is comprehensively analysed in the Annual Report, amounted to £6,746,453, thus giving a working profit for the year of £1,732,728, which figure was £108,105 lower than the profit for the previous year.

POSITION AT THE MINE

Development and exploitation of the ultra deep areas on the southern boundary of the Company's mining property is proceeding satisfactorily and in accordance with a general long-term programme. It is planned to sink the Far East Sub-Vertical Shaft to a depth of some 9,600 feet and to deepen the South-East Sub-Vertical Shaft to about the same depth. At April 30, 1959, the Far

East Sub-Vertical Shaft had reached a depth of 1,411 feet below collar, 879 feet having been sunk during the current financial year. The extension of the incline shafts and pilot winzes continues at depth together with the necessary improvements in the ventilation, pumping, and other arrangements.

A decision has been taken to replace the obsolete Angelo and Cason reduction works with a new central plant to be situated in the vicinity of the Central Shaft at a cost of approximately £2,400,000. It is anticipated that this amount will be offset by savings in costs during the first seven years of operation. Work on the erection of the new plant has commenced and the old plants will be dismantled as soon as circumstances permit. The overall capital programme for the five-year period commencing January, 1959, including the cost of the new reduction works, is estimated at £5,400,000. In order to assist the financing of this programme, arrangements have been made to borrow £1,000,000 from The National Finance Corporation of South Africa in two loans of £500,000 each, repayable not later than five years after they have been drawn. The loans will be drawn on August 1, 1959, and August 1, 1960, respectively.

PNEUMOCONIOSIS

The annual levy paid during the year ended March 31, 1959, by Group A controlled mines amounted to £2,467,500. The levy for the current year has been fixed by the Pneumoconiosis Board at a net amount of £800,000. This substantial reduction in the levy is due in the main to a decrease in the number of new cases of pneumoconiosis and tuberculosis amongst mine employees. Moreover, it is expected that this liability will be reduced further because of a surplus existing in the Controlled Mines' Compensation Fund as disclosed in a recent valuation of the Fund carried out in terms of the Pneumoconiosis Act.

TAXATION

In his Budget Statement on March 25, 1959, the Hon. the Minister of Finance announced that it was proposed that the concession granted to "ultra deep" gold mines of adding 5 per cent interest per annum to the capital expenditure which could be deducted from profits for tax purposes, would be extended to any existing mine whose chief object is the mining of gold from depths of more than 7,500 feet. This Company's mine falls within the category to which this taxation concession is applicable, but it is not possible to assess the extent to which the Company will benefit until after the full terms of the amendment to the Income Tax Act are known.

TRANSVAAL CONSOLIDATED LAND AND EXPLORATION COMPANY, LIMITED

(Incorporated in
the Union of South Africa)

The Sixty-fourth Ordinary General Meeting of shareholders will be held in Johannesburg on May 26, 1959. The following is an extract from the circulated statement by the Chairman, Mr. T. Reekie, dated May 19, 1959.

ACCOUNTS

The profit before taxation amounted to £336,148, which was £19,162 higher

than for 1957, due mainly to increased amounts received in respect of mineral royalties and from dividends from investments. The net provision for taxation on the basis of the previous year's proposals, excluding the savings levy, absorbed £88,873. Although no other changes affecting this Company were proposed in the recent Budget, the savings levy of 6d. in the £ on non-mining income has been reimposed for the fiscal year ending June 30, 1959. This levy, amounting to approximately £7,250, will be refunded with tax-free interest five years after payment. Dividends declared in 1958, which were increased from 3s. 6d. to 4s. 3d. per share, totalled £197,676 compared with £162,792 for the previous year. The Board decided to increase the General Reserve by a transfer of £350,000 from the Income and Expenditure Account, reflecting the increase in the Company's investment portfolio. The net cash position of the Company decreased from £558,659 at the end of 1957 to £452,123 at December 31, 1958.

VAN DYKS DRIFT COLLIERY

The Colliery continued to produce high-grade coal throughout the year, but output was restricted by inadequate supplies of railway trucks, particularly in the middle of the year, and 669,150 tons of coal were dispatched from the Colliery compared with 679,445 tons during 1957. The working profit at £182,023 was less by £3,356 when compared with the previous year.

With effect from October 31, 1958, an increase in the price of Transvaal and Orange Free State coal of 1s. 3d. per ton was granted by the Price Controller. While this improvement in price was welcome, the continuing upward trend in the level of costs in the industry has already absorbed a portion of the increase.

The sales output for the first four months of the current financial year was 202,869 tons, which is a falling off of 24,414 tons compared with the output for the same period in 1958. The Colliery continues to be adequately equipped to handle any likely demand for increased output.

There has been a substantial influx of non-European labour and, in this regard, the Colliery's requirements have been fully met.

SUBSIDIARY COMPANIES

The Company maintained its interests in Winterveld (T.C.L.) Chrome Mines (Proprietary), Limited, and in Rooderand Chrome Mine (Proprietary), Limited.

A satisfactory tonnage of chrome ore was railed by these companies during the year, but due to the prevailing weakness in the chrome market, there was a decline in the average price obtained for contracts entered into for delivery subsequent to the close of the financial year.

INVESTMENTS

The list of the Company's principal investments was extended by the inclusion during 1958 of shareholdings in Buffelsfontein Gold Mining Company, Limited, Pretoria Portland Cement Company, Limited, The Corner House Investment Company, Limited, and West Witwatersrand Areas, Limited. The market value of quoted investments at December 31, 1958, viz. £1,233,382, was £422,692 higher than the value at the end of 1957. Dividends accrued from investments during the year totalled £82,088 compared with £64,796 for the previous year.

RHODESIA-KATANGA COMPANY LIMITED

MR. C. J. HOLLAND-MARTIN'S SPEECH

The Annual General Meeting of Rhodesia-Katanga Company Limited was held on May 13, 1959, at The Chartered Insurance Institute, E.C.2. Mr. C. J. Holland-Martin, M.P., (Chairman), presiding, drew attention to the following features:

Kansanshi Mine

The Kansanshi mine was partially flooded in October 1957. All production ceased and the mine was placed on a care and maintenance basis and has remained so since.

In December 1957 the Kansanshi Company decided to spend £40,000 on research into an integrated process for simultaneous exploitation of both sulphide and oxide ore reserves with production of electrolytic copper via roast-leach techniques. This work was pursued diligently from early January 1958 under the general supervision of the Consultants, and was completed by the end of June 1958 at a total cost of approximately £32,000. The technical results of this laboratory research were most satisfactory and process elements were outlined for a recovery of 90 per cent. of the copper treated in a mixture of sulphide concentrate and oxide ore, balanced to known reserve grades and tonnages.

In order to assess the commercial prospects for the process applied at the Kansanshi site, a preliminary review was undertaken immediately by the Consultants, as a result of which a programme of practical, continuous operation of the process on a pilot plant scale was decided upon in order to provide firm estimates of capital and operational costs, since certain metallurgical and engineering features of the process were unique.

The Consulting Engineers have reported as follows: "Laboratory re-

search into an integrated process for joint treatment of Oxide and Sulphide Ores continued to a point where it was decided that the construction of a pilot plant was justified. This is proceeding according to plan and is expected to be complete by the middle of 1959. A fluid bed reactor has been designed and built, and work is proceeding on the leaching, evaporating and electrolytic sections.

With the assistance of Nchanga Consolidated Copper Mines Limited, samples of various Kansanshi Ore types amounting to 600 tons were extracted and transported to the pilot plant site in Kitwe, ready for treatment when the plant is completed.

If the pilot plant work, expected to be finished by the end of 1959, proves that the process is technically practicable, it will be possible to determine the cost of the necessary treatment plant. The economic implications of installing such a plant can then be examined, bearing in mind Kansanshi's situation remote from railhead and sources of power."

The remoteness of the mine is a factor which can be overcome, provided that the economics of the operation prove to be sufficiently attractive, and shareholders should remember that the Kansanshi claims are held free from the burden on operating costs of the heavy royalty payments to which other Northern Rhodesian copper producers are subject.

Mineral Areas

The Consulting Engineers have confirmed that the mineralization in the no. 2 Area is not of economic proportions, and propose to carry out at a later date an investigation of that part of no. 1 Area which is covered by basement rocks.

The report and accounts were adopted.

Mining in Norway

Teams of Norwegian Government geologists will this summer survey deposits of several important metal ores in northern Norway. One group will study the extent and quality of nickel deposits in the Rana district, and the immediate aim here is to determine whether the deposits are worth exploiting. Until the beginning of World War II, Norway was the biggest nickel producer in Europe, but in 1946 the last two mines were closed down owing to the exhaustion of commercial-grade ore. Deposits of manganese ore in the Ofoten-Maas river area will also be surveyed this summer. Initially, the survey will aim at determining the extent of the deposits; later on, bores will be made to permit a study of the quality of the ore. At present, no manganese ore is mined in Norway, and considerable amounts are imported annually for the country's ferro-alloy industry. Other surveys scheduled for this summer are of copper deposits in the Porsa district of Finnmark, and lead deposits in the Porsanger area, also in Finnmark.

The A/S Røros Kobberverk plans to make an aerial electromagnetic survey over 1,800 sq. km. of its old mining field, which has been incessantly explored and exploited for more than 300 years. The field of the neighbouring Killingdal pyrite mine will be surveyed on the same occasion.

MINING GEOLOGIST

Minimum five years' experience in pre-Cambrian areas, required for 18 months in Portuguese Angola. Geophysical experience desirable. Send résumé in confidence to Box No. 636, *The Mining Journal Ltd.*, 15 Wilson Street, Moorgate, London, E.C.2.

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